THE RELATIONSHIP OF KNOWLEDGE AND PERCEIVED BENEFITS TO COMPLIANCE WITH DIET AND BLOOD PRESSURE

By

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ABSTRACT

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The purpose of this retrospective and descriptive study was to determine the relationship of knowledge and perceived benefits of diet to compliance with diet and to each other, and the relationship of diet compliance to improvement in blood pressure. Data utilized were collected among 67 hypertensive clients who participated in an experimental nursing intervention to foster compliance with therapeutic regimens and who were prescribed a low sodium and/or weight loss diet. Interviews, self-administered questionnaires, and medical record audits were the methods used to obtain data.

Data were analyzed using descriptive statistics, product moment correlations, and t-tests. A significant finding was a positive relationship between perceived benefits of diet and compliance with diet. There was no relationship between knowledge and compliance nor knowledge and perceived benefits. Although compliance with diet significantly declined from intake to termination of the study, blood pressure significantly improved. Improved blood pressure was significantly related to medication compliance, examined as an extraneous variable. Nursing interventions intended to foster compliance with diet among hypertensives can consider these findings in a plan of care.

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CHAPTER I

The Problem

Introduction and Background

Cardiovascular disease is the number one cause of death in the United States (American Heart Association, 1985) and the leading cause of cardiac disease is hypertension (American Heart Association, 1985; Marcinek, 1980). It is estimated that more than 65 million Americans have high blood pressure (The Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure, JNC, 1984). According to Kaplan (1983), hypertension is responsible for cardiovascular disease that kills one million Americans each year and is probably the greatest public health problem of the times (Kochar, 1981). Hypertension is the number one cause of morbidity and mortality from stroke and contributes significantly to kidney failure (American Heart Association, 1985; Andreoli, 1981; Barker, Feldt, and Fiebel, 1983; Borhani, 1981; Fink, 1981; Haines and Ward, 1981; Marcinek, 1980; Smeltzer, 1980).

There are 58 million Americans estimated to be at risk for morbidity and mortality associated with high blood pressure (Subcommittee on Definition and Prevalence of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure, 1984). It costs billions of health care dollars annually (Fink, 1981) and billions of dollars to the American economy in lost productivity (Hoyt, 1978). Hypertension is the most common reason for physician office visits in the United States (Kaplan, 1984), and it is

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the leading preventable cause of death in the world today (Kaplan, 1978).

The goal of treatment for high blood pressure is to prevent morbidity and mortality from hypertension and can be accomplished through compliance with the recommendations of the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure (JNC, 1980, 1984). Among these recommendations are dietary alterations to control weight and restrict salt intake. Several researchers and experts have presented convincing evidence that weight control and sodium restriction contributes significantly to blood pressure control (Anderson, Fagerberg, and Hedner, 1984; Berchtold, Jorgens, Finke, and Berger, M., 1981; Cunningham and Hill, 1982; Dustan, 1983; Dyer et al., 1982; Egam and Julius, 1983; Eliahou, 1981; Fries, 1976; Frolich, 1982; Gillum et al., 1983; Shils and Goodhart, 1980; Guthrie, 1983; Havlik, Hubert, Fabsitz, and Manning, 1983; Holbrook, Cottrell, and Smith, 1984; Hovell, 1982; Hunt, 1983; Kaplan, 1983, 1985; JNC, 1982, 1984; Langford, 1982; Margie and Hunt, 1981; McCarron, Stanton, and Henry, 1983; Moser, 1982; Reisen, Abel, and Modan, 1978; Schweiker, 1983; Sims and Berchtold, 1982; Stamler, Stamler, Reidlinger, Algera, and Roberts, 1978; Stamler, et al., 1980; Tobian, 1978; Tuck, Sowers, Dornfeld, Kledzik, and Maxwell, 1981; Working Group on Critical Behaviors in Dietary Management of High Blood Pressure, 1983; Young and Landsburg, 1982). According to several experts, dietery treatment for hypertension should be vigorously pursued for clients who are at low risk for other atherosclerotic factors and when diastolic pressure is less than 100 mm Hg since drug treatment may expose clients to unnecessary

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If diet is to be effective in the treatment of hypertension, individuals must comply with the dietary prescription, and gaining patient compliance to dietary restrictions is often difficult (Glanz, 1980; Haynes, Sackett, and Tayler, 1980; Kirscht and Rosenstock, 1977; Silverberg, 1980). Dietary noncompliance is generally even higher than noncompliance with medication regimens (Glanz, 1980; Kirscht and Rosenstock, 1977). One explanation for this may be that both are associated with high degrees of noncompliance (Becker, 1979; Glanz, 1980). Although there is generally a lack of sufficient data about dietary compliance and the data available is of poor quality, there is data from studies that indicates dietary compliance for cardiovascular disease ranges from 13-76 percent (Glanz, 1980).

Past researchers have explored several reasons for failure to comply with health regimens (Andreoli, 1981; Daniels and Kochar, 1979; Given, Given, and Simoni, 1978; Given and Given, 1983; Glanz, Kirscht, and Rosenstock, 1981; Haynes et al., 1980; Hershey, Morton, Braithwaite, and Reichgott, 1980; Hulka, 1979; Kirscht and Rosenstock, 1977; Loustau, 1979; Morisky et al., 1980; Nelson, Stason, Neutra, and Solomon, 1978; Powers and Wooldridge, 1982; Rosenstock, 1975; Swain and Steckel, 1981). The health belief model has been used as a framework for many of these studies.

According to the health belief model, an individual's likelihood to take action or comply with a therapeutic regimen, including diet, depends on whether or not there is: 1) perceived susceptibility to

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the disease and the disease is perceived as posing a threat; 2) perceived benefits to following the treatment plan that outweigh the perceived barriers (financial, emotional, and social costs). There are a number of factors included in the model which can modify these perceptions. One such factor is knowledge.

Although the health belief model has been used to explore reasons for noncompliance with treatment regimens, there is little research specifically related to dietary noncompliance (Glanz, 1981). Research in the area of dietary compliance is therefore critical. Diet is becoming increasingly important in the treatment of hypertension (Kaplan, 1983, 1985; Gillum et al., 1983; Working Group on Critical Patient Behaviors in the Dietary Management of High Blood Pressure, 1982). Dietary adherence can contribute to blood pressure control and therefore help decrease the high levels of hypertension associated with morbidity and mortality. Compliance with diet can decrease the need for medication to control blood pressure and therefore decrease the associated iatrogenic effects (Kaplan, 1983; Gillum, 1983; Perez-Stable, 1983; Zeigler, 1984). Through blood pressure control, there can be a decrease in health care costs associated with the complications of hypertension (Connelly, 1984).

Nursing has a major role in contributing to hypertension control. A role for nursing in hypertensive care was established in 1975 by the National High Blood Pressure Education Program in cooperation with the American Nurses' Association and the National League for Nursing. Six goals were developed and include: 1) promoting client/family understanding of the disease and the prescribed treatment; 2) facilitating successful adjustment to the diagnosis and treatment;

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3) facilitating assumption of responsibility by the client for self-care within psychological and physical capabilities; 4) achieving blood pressure control consistent with the medical goal; 5) limiting side effects from medications; and 6) limiting end organ damage due to hypertension or its treatment (Giblin 1978; Grim and Grim, 1981).

Accomplishing these goals requires that nurses are not only knowledgeable about hypertension and its treatment, but also knowledgeable about strategies that facilitate client involvement and compliance with the treatment regimen, including the dietary prescription. Nursing should assist the client to develop the necessary skills to adopt the role of complier (Dracup and Meleis, 1981).

Compliance and, conversely, noncompliance are human responses to illness and it is nursings' role to diagnose and treat such responses (American Nurses' Association, 1980). Gordon (1984) identifies noncompliance as a nursing diagnosis. Treatment of this diagnosis involves understanding reasons for noncompliance and developing appropriate strategies to ameliorate, improve, or correct the condition in order to prevent illness (such as end organ damage) and promote health (American Nurses' Association, 1980). Nursing theory and the health belief model can provide a conceptual framework for research involving dietary compliance and contribute to the development of the necessary treatment strategies.

Facilitating dietary compliance will contribute to achievement of the blood pressure goal and so contribute to limiting end organ damage associated with high blood pressure. Nursing intervention that facilitates compliance with a dietary regimen will not only,

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therefore, contribute to a decrease in hypertension mortality and morbidity, but also contribute to cost containment since the complicating conditions of prolonged hypertension require medical intervention. Since weight loss and sodium restriction can decrease blood pressure, strategies that promote compliance with these prescriptions can also lessen the need for medications and so the iatrogenic effects of treatment (Andreoli, 1981; Connelly, 1984; Kaplan, 1983, 1985).

Even if medications are used, it does not relieve the client of the need to follow the prescribed diet (Kaplan, 1985), nor does it relieve the health care provider of the responsibility for developing appropriate knowledge and perceptions to promote adherence. Appropriate strategies can be developed from research that explores factors that influence compliance with dietary regimens. Research is also needed to determine if there is a relationship between dietary adherence and blood pressure control since such data contributes to the scientific rationale for nursing intervention. Data from this study will be used to examine the changes that occur in two aspects of the health belief model among hypertensive clients who participated in a nursing intervention: knowledge about diet and perceived benefit of diet. Data from the study will also be used to examine the relationship of compliance with diet to blood pressure improvement.

Purpose of the Study

The purpose of this study is to determine the relationship between and among selected characteristics and dietary compliance in individuals with hypertension who participated in an experimental nursing intervention. In particular, knowledge about diet and

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perceived benefits of therapy, specifically diet, will be examined as they relate to compliance with diet prescriptions. Whether or not compliance with diet contributes to blood pressure improvement will also be explored. An individual's perception of treatment benefits is a major component of the health belief model that is modified by knowledge. Both influence the likelihood that an individual will engage in health related behaviors.

The data obtained can be used to contribute to nursing knowledge concerning factors that influence compliance and, therefore, can help to plan client care. The research can also contribute to empirical support of the health belief model as a framework for promoting health-related behaviors.

Problem Statement

The specific problems are:

1. How does knowledge about diet and perceived benefits of diet relate to compliance with diet before and after a nursing intervention? Specifically: a) is there a relationship between client knowledge about diet and compliance with diet before and after a nursing intervention? b) is there a relationship between client perceived benefits of diet and compliance with diet before and after a nursing intervention? c) is there a relationship between client knowledge about diet and perceived benefits of diet before and after a nursing intervention?

2. How does compliance with diet relate to blood pressure levels before and after a nursing intervention?

Research is needed to answer these questions. The data obtained will be utilized to provide information concerning the characteristics

of hypertensive individuals that are related to compliance with diet prescriptions. Data will be used to answer questions concerning the relationship of knowledge to compliance, perceived benefits to compliance, and the relationship of knowledge to perceptions of benefits, specifically concerning diet. The data will also be used to explore the relationship of dietary compliance to blood pressure levels. The information can be used to facilitate appropriate provider-client interaction to promote compliance behaviors in future clients and contribute to the National High Blood Pressure Education Program's (NHBPEP, 1972) and the United States Public Health Service's (1983) goal to control hypertension and therefore decrease associated mortality and morbidity.

The knowledge can be used to contribute to information concerning the defining characteristics of compliance which is a human response to illness amenable through appropriate nursing intervention (American Nurse's Association, 1980). The data can also be used to contribute to the development of strategies to treat noncompliance, an acceptable nursing diagnosis (Gordon, 1984).

The research can also be used to provide information to improve understanding of health related behaviors and factors that contribute to client participation in therapeutic regimens. Since the health belief model is a framework that shows how knowledge and perceptions are related to health actions of individuals, the data from the study will provide empirical support for activities directed toward knowledge, perceptions and beliefs thought to influence the likelihood of compliance.

Since resource conservation is becoming critical in health care, data concerning factors that contribute to client compliance can be utilized to determine priorities for provider activities. For example, if improving knowledge about diet contributes to compliance, then it is worthwhile to invest health care dollars and provider time in dietary educational efforts. Knowledge concerning factors that promote compliance with diet as a treatment regimen can decrease health care costs in general by decreasing the use of the health care system from iatrogenic effects of medications used to treat hypertension (Kaplan, 1983, 1985). Control of hypertension, whether diet is used as a sole treatment or as an adjunct to medications, decreases the costly care that would be required due to damage to the kidneys, brain, heart and eyes from sustained blood pressure elevations (Andreoli, 1984; Connelly, 1984).

The data utilized in the study to answer the research questions were collected as part of a federally funded research project, Patient Contributions to Care: Link Process to Outcome (5ROINU00662, 1982), B. Given and C. W. Given, co-principal investigators.

Definition of Variables

The variables in this study are knowledge about diet, perceived benefits of diet, compliance with the dietary prescription, and blood pressure.

Knowledge Defined

Knowledge is defined as the cognitive resources the client has to describe hypertension and the therapeutic regimen. Knowledge for this study includes factual information that clients recall and report when questioned about the dietary treatment plan (Given and Given, 1982,

p. 26). This study is limited to information clients have and how they use it and will not address how such information is obtained.

The Joint National Committee (1984) states there is evidence from recent research that health education along with frequent reinforcement of the educational messages increases long term adherence, blood pressure control and therefore reduces mortality. Given et al. (1978) found that knowledge was positively associated with perceived benefits from medications and that both influenced compliance. Knowledge showed more correlation to compliance at the beginning of treatment whereas perceived benefit showed more correlation later in treatment (Given et al., 1978). Given and Given (1983) state that knowledge can become the basis for developing appropriate beliefs concerning benefits to treatment.

Perception Defined

Perception is the individual's views of reality that include the awareness of persons, objects and events (King, 1981, p. 20). Individuals differ in their views of reality based on past experience, values, self concept and their sensory and intellectual capabilities. Perceptions are influenced by context and processes. They are subjective, universally influenced by current interests, needs and goals, and can only be observed in terms of transactions with the environment (King, 1981).

Based on a review of the literature, nursing theorist King (1981, p. 4) defines perception as a process of human transaction with the environment that gives meaning to one's experience, image of reality and impacts behavior. The process of perception involves organizing,

interpreting and transforming information from sensory input and memory (King, 1981).

Perceived Benefits of Diet

Perceptions of benefits to diet for this study are defined as the specific beliefs and attitudes the client has concerning following the diet, specifically a weight loss and/or sodium restricted diet. Benefits include how following the diet would contribute to hypertension control and prevent complications that would impair future role performance (Given and Given, 1982, p. 27).

Nelson et al. (1978) found that perceived benefit of the treatment regimen for hypertension contributed positively to blood pressure control. Cummings, Becker, Kirscht, and Levin (1982) found that beliefs concerning efficacy of behavior and barriers to behavior were consistent predictors of adherence to medical regimens in hemodialysis patients which require dietary management. Black (1984) states that demonstrating to the client the benefits of following the treatment by showing clients their blood pressure reading increases compliance.

Compliance

Compliance is the extent to which to client follows the therapeutic recommendations of health care providers (Daniels and Kochar, 1980; Dracup and Meleis, 1982; Given and Given, 1982, p. 28). For this study, compliance is based on the clients report of following a dietary prescription for weight loss and/or sodium restriction. A five point scale ranging from all of the time to none of the time is the measure to elicit stated compliance with the dietary prescription, specifically sodium and/or calorie restriction.

Blood Pressure

Blood pressure is defined as the actual measurement obtained using two or more readings at intake and termination of the nursing intervention. The World Health Organization (1981) defines hypertension as synonomous with essential hypertension and as such, it is designated by physiological and anatomical changes which ultimately lead to an elevation of diastolic and systolic pressure, changes in the vascular bed and impairment of involved tissue.

The report of the JNC (1984) states that "hypertension in adults is confirmed when the average of two or more diastolic blood pressures on at least two visits is 90mm Hg or higher, or when the average of multiple systolic blood pressures on two or more subsequent visits is consistently greater than 140 mm Hg" (p. 1045). Table 1.1 represents the classification of blood pressure according to the JNC. Hypertension is operationalized in this study as a systolic pressure greater than 140 mm Hg. systolic and/or a diastolic pressure greater than 90 mm Hg. on two occasions at least two months apart, which is consistent with the standard of practice (Chobanian, 1982; Given and Given, 1982, p. 61). Improved blood pressure is defined in this study as a statistically significant decrease in systolic and/or diastolic blood pressure from intake to termination of the nursing intervention.

Table 1.1

Classification of Blood Pressure

Range, mm Hg	Category
Diastolic	
Less than 85	Normal B/P
85-89	High normal B/P
90-104	Mild hypertension
105-114	Moderate hypertension
115	Severe hypertension
Systolic, when diastolic is 90 or less	
Less than 140	Normal B/P
140-159	Borderline isolated systolic hypertension
160	Isolated systolic hypertension

Source: Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (1984).

Assumptions

The following assumptions are made in this research:

1. Compliance with a therapeutic regimen, including diet, is a health behavior that will improve present and future health status.

2. Health-related perceptions influence compliance with diet and other health-related behaviors.

3. The concepts of knowledge about diet, perceived benefits of diet, and compliance as defined in this study are real and measurable phenomena.

4. Measurement of stated compliance is a reliable method of measuring compliance to therapeutic regimens, including diet, in hypertensive clients.

5. Client behaviors can impact and control chronic disease.

6. The testing instruments are sensitive to the concepts of knowledge about diet, perceived benefits of diet, and stated compliance with diet.

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

8. Compliance with diet has an additive effect on blood pressure control.

Limitations

This research has the following limitations:

1. Subjects who agreed to participate in this study may be different from those who refused. Therefore, it is possible that the findings are not representative of all hypertensive clients in primary care settings.

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

3. Individual differences in perceptions of answer choice may have affected responses.

4. The need to express a socially desirable response may have affected the responses of individuals.

5. All possible factors affecting compliance with diet are not addressed in this study. Findings may be due, in actuality, to an interrelatedness of factors other than the ones identified. Examples of such factors which are not included in this study are: other aspects of the health belief model, provider-client relationship, developmental stages and social support.

6. This study is limited to those clients who participated in a nursing intervention and were prescribed a low sodium and/or weight loss diet so results cannot be generalized to other client groups.

Overview of Chapters

Presentation of this study is organized into six chapters. Information in Chapter I is the introduction, the purpose of the research, the problem statement and research questions, the background of the problem, definitions of variables, and the assumptions and limitations. In Chapter II, the concepts and relevant theory are integrated into a conceptual framework that is the basis for the study. A literature review is presented in Chapter III which links this research with the work and ideas of others concerned with hypertension and compliance with treatment. A presentation of the methods of research used to conduct the study is found in Chapter IV.

Included are the research design, instrumentation, procedures and human rights protection. Data and analyses are presented in Chapter V. A summary and discussion of findings, implications for nursing and education, and recommendations for future research are presented in Chapter VI.

CHAPTER II

Conceptual Framework

Overview

This chapter includes a discussion of the treatment of hypertension, the health belief model, and nursing theory as delineated by King (1981). The concepts of knowledge, perceived benefits, compliance and their relationship to blood pressure are presented within the context of the health belief model and nursing theory. The concepts are integrated for application of nursing intervention relative to hypertensive clients. The purpose of this study is to examine the relationship of these variables within a conceptual framework to determine if the variables of knowledge about the dietary regimen and perceived benefits of diet significantly influence the hypertensive client's compliance with the dietary prescription (specifically, sodium and/or calorie restriction) and if compliance with the diet prescription influences blood pressure levels.

Treatment of Hypertension

Treatment of hypertension results in a reduction in morbidity and mortality. Borhani (1981, 1982) and Kochar (1981) collected data from a Veteran's Administration study and the results demonstrated that blood pressure control reduces the incidence of CHF, MI, and CVA.

The Framingham Study that involved over 5000 male and female participants had results that provide evidence that hypertension is the most powerful contributor to CVA and that the atherosclerotic process leading to both coronary artery disease and cerebral

thromboses is related to blood pressure levels. There was also evidence from the findings that controlling blood pressure decreases morbidity and mortality to approximately that of normotensive individuals (Dawber, 1980; Kannel, 1982).

The Hypertension Detection and Follow-up Program (1982) has conducted yearly studies of mortality on over 10,000 participants with diastolic pressures greater than 90mm Hg. Among the findings from this group is that treatment decreases the overall mortality associated with hypertension even in those clients with mild levels of high blood pressure.

It is, therefore, the recommendation of the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure (1980, 1984) that blood pressure be reduced to normotensive levels or as near normotensive as possible. The JNC supports the use of pharmacological therapy using the stepped care approach (Table 2.1) in those clients whose diastolic blood pressure is consistently above 95 mm Hg. and for those clients who are at high risk for cardiovascular and cerebrovascular morbidity and mortality such as clients with target organ damage or diabetes mellitus. The JNC (1984) further recommends that nonpharmacological treatment be utilized as both definitive therapy and as an adjunct to pharmacological therapy to control blood pressure.

Nonpharmacological therapy is becoming especially important as definitive treatment for clients with mild hypertension (diastolic pressures of 90-104 mm Hg.) and for clients with isolated systolic hypertension whose pressures are less than 160 mm Hg. Clients who

Table 2.1

Stepped Care Approach to Drug Therapy

Step	Drug Regimen
1	Begin with less than a full dose of either a thiazide-type diuretic or a B-blocker, proceed to full dose if necessary and desirable.
2	If BP control is not achieved, either add a small dose of an adrenergic-inhibiting agent or a small dose of thiazide-type diuretic; proceed to full dose if and desirable; additional substitutions may be made at this point.
3	If BP control is not achieved add a vasodilator, hydralazine hydrochloride, or minoxidil for resistant cases.
4	If BP control is not achieved, add guanethidine monosulfate.

Source: Joint National Committee on Detection, Evaluation & Treatment of High Blood Pressure (1984).

participated in the Multiple Risk Factor Intervention Trial and whose diastolic pressures were between 90-94 mm Hg who were treated with the stepped care approach actually had more deaths than clients whose blood pressures decreased without treatment (Grim, Cohen, Smith Faber-Gerad, & Neation, 1985; Kaplan, 1983; Moser, 1984). Perez-Stable (1983) states that only clients with diastolic pressures between 90-100 mm Hg whose risk for atherosclerosis can be decreased by lowering blood pressure should be considered candidates for drug therapy.

McAlister (1983) reviewed the findings from the Hypertension Detection and Follow-up Program and several other studies and states these trials fail to show significant reproducible benefits from treating uncomplicated mild hypertension. The Medical Research Council Working Party (1985) found that active treatment of mild hypertension had no overall effect on mortality and that although there was some benefit in men, treatment had an adverse effect on women, but treatment was associated with a reduction in the incidence of CVA.

Kaplan (1984) believes that the chemical changes caused by the pharmacological agents used to treat hypertension may actually precipitate coronary heart disease since hypokalemia, hypercholesterolemia, and glucose intolerance occur with drug use. Flamenbaum (1983), in a review of several studies, reported several consequences associated with antihypertensive agents including altered lipid metabolism, hypokalemia, hyperglycemia, increased renin activity, metabolic alkalosis or acidosis, and an elevation in uric acid levels.

As a result of the controversial evidence regarding treatment of mild hypertension, The JNC (1984) and the World Health Organization's International Society of Hypertension (WHO/ISH, 1983) recommend aggressive nonpharmacological treatment for those clients with a diastolic pressure of 90-94 mm Hg who are otherwise at low risk while blood pressure is carefully monitored. Kaplan (1985) supports The JNC and WHO/ISH recommendations and states there is a need for better controlled, long-term studies on efficacy of drug treatment for mild hypertension. Kaplan (1985) further recommends that nonpharmacological treatment be included in the management of all hypertensives.

The nonpharmacological treatment recommended by The JNC (1984) includes: weight reduction, sodium restriction, alcohol restriction, dietary fat restriction, cessation of smoking, exercise, and stress reduction. Reduction of weight in overweight hypertensives and reducing dietary sodium are the two consistent recommendations in the literature to contribute to hypertension control (Gillum et al., 1983; Guthrie, 1983; Hodges and Rebello, 1985; Kaplan, 1984, 1985; National High Blood Pressure Education Program, 1979; The JNC, 1984). Moore (1982) adds nonpharmacological treatment to the stepped care approach by stating that step 1A should be the foundation of all hypertension management and should include client education, a low sodium diet, weight reduction, tobacco cessation, exercise, and stress management.

Nonpharmacological treatment, whether as the sole treatment for a client with hypertension, or as an adjunct to pharmacological treatment, requires alteration in behavior and requires client adherence to be successful. The critical behaviors for the

hypertensive client are making the decision to control blood pressure and to adhere to diet and professional attitudes that reflect a positive approach and sensitivity to racial, cultural and individual differences that can positively influence adherence (The JNC, 1984).

Nurses can facilitate adherence, specifically to diet, by assessing clients for adherence problems including readiness to control blood pressure and to learn related behaviors, suggesting solutions to adherence problems, educating clients, and monitoring progress (The JNC, 1984). Nursing is especially effective in meeting health care needs of hypertensive clients through use of the nursing process to assist clients to modify life styles and the environment to cope with hypertension and prevent complications (Grim and Grim, 1981). Dietary prescriptions for weight loss and sodium restriction require lifestyle and environmental changes that can be enhanced by appropriate nursing strategies.

The Report of the Working Group on Critical Patient Behaviors in the Dietary Management of High Blood Pressure (Working Group, 1982) includes ten steps to facilitate permanent changes in eating habits to control blood pressure. The client must: 1) acknowledge the disease; 2) consider diet as a sole or adjunctive method to help control blood pressure; 3) participate in assessing current dietary patterns; 4) acknowledge that diet changes must be long term; 5) participate in developing strategies and dietary goals; 6) assist in planning dietary changes; 7) make the necessary changes; 8) participate in the assessment of success of each change; 9) participate in the assessment of blood pressure goal attainment; and 10) participate in developing a plan for maintaining dietary changes as goals are reached. The role

of the professional is to facilitate successful outcomes at each step in the dietary management program (Working Group, 1982).

In summary, blood pressure control can occur using pharmacological and/or nonpharmacological measures either separately or together in a therapeutic regimen. Control, however, requires that the client follows the therapeutic regimen whether it involves a new behavior, such as pill taking, or an alteration in behaviors such as dietary modification.

Facilitating successful outcomes requires that the nurse understand factors that increase the likelihood that the client will engage in the behaviors necessary for implementation of the regimen, including diet. The health belief model can be used as an explanation of factors that increase the likelihood that individuals will follow a recommended treatment plan and can be used to develop and provide a rationale for strategies to assist the hypertensive client in developing critical behaviors for blood pressure control, including those behaviors for dietary management outlined by the Working Group (1982).

The Health Belief Model

The health belief model as introduced in Chapter I is a psychological formulation originally developed to explain health-related behaviors. The model was first used as an attempt to explain why some individuals engage in preventive health behaviors at an individual decision-making level and others do not.

The variables of the health belief model were drawn and adapted from social psychological theory developed by Lewin in 1948. Lewin's theory postulates that an individual exists in life spaces that are

composed of regions. These regions may have a positive valance, a negative valance, or be relatively neutral. If illness were represented in the life space, it would be in a region of negative valance which would then be expected to exert a force to move the individual away from that region, unless doing so would require that the individual enter a region of even greater negative valance. Another assumption of Lewin's theory is that the subjective world of the individual is what determines behavior rather than the objective environment. The theory is more concerned then, with the current subjective state of the individual rather than with history or experience (Maiman and Becker, 1974; Rosenstock, 1974).

Since Lewin's early attempt to predict behavior when choices are made, other theories have evolved. Maiman and Becker (1974) call them models of motivation. Included are Tolman's model called performance behavior, Rotter's reinforcement or social learning model, Edward's risky-choice model, Atkinson's risk-taking model, and Feather's decision-making-under-certainty model. All five deal with an individual's perceived benefit compared to belief that an action will lead to desired outcomes. Rosenstock's model incorporates all five theories. The model "analyzes an individual's motivation to act as a function of the expectance of goal attainment in the area of health behavior" (Maiman and Becker, 1974; p. 21).

According to the original health belief model (Rosenstock, 1960), in order for an individual to take action to avoid illness, the individual would need to believe: That they were personally susceptable to the disease; that the occurrence of the disease would have at least moderate severity on some aspect of their life; and that

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taking a particular action would be beneficial by reducing their susceptibility to the disease or, if illness has occurred, by reducing its severity. The individual must also believe that the benefits of such action would be greater than perceived physical, social, or psychological barriers, such as cost, inconvenience, and discomfort. According to the health belief model then, even though an individual may be ready to take action, the likelihood of taking such action to reduce the threat of disease depends on beliefs about the probable effectiveness of the action in reducing the threat and about the barriers that would be encountered if such action is taken (Rosenstock,1974).

The health belief model also proposes that a cue to action (stimulus) must occur to trigger appropriate behavior. The cue might be internal, such as perception of bodily state, or external, such as illness of a family member or friend or exposure to mass media. There are also modifying factors in the model that influence behavior. The modifying factors include: demographic variables (age, sex, race, etc.); structural variables (knowledge, prior contact); and sociopsychological variables (personality, social class, peer and reference group pressure). The modifying factors and the cues both influence perceptions concerning susceptibility, severity, and threat of disease. The modifying factors also influence perceptions of benefits and barriers to taking action (Rosenstock, 1974).

The health belief model has been utilized to examining preventive health behaviors: screening tests for tuberculosis, cervical cancer, rheumatic fever, and dental disease (Rosenstock, 1974). Pender (1982) modified the model in an attempt to synthesize available literature

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concerning individual decision-making about engaging in health promoting behavior such as exercise. Although the original model and Pender's model are concerned with preventive and health promoting behavior, there have been a number of studies which have used one or more variables to predict client compliance with therapeutic regimens to treat chronic disease (Andreoli, 1981; Becker, Maiman, Kirscht, Hafeman, & Drachman, 1977; Cerkoney and Hart, 1980; Cummings, Becker, & Maile, 1982; Devon and Powers, 1984; Given and Given, 1982; Glanz, Kirscht, & Rosenstock, 1981; Green, Weinberger, Jerin, & Mamlin, 1982; Hershey et al., 1980; Kirscht and Rosenstock, 1977; Morisky, Bowler, & Finlay, 1982; Taylor, 1979).

The model presented in Figure 1 is modified from the original health belief model formulated in the 1950's by Hochbaum, Levanthal, Kegeles, and Rosenstock (Rosenstock, 1974). The same variables of perceived susceptibility, perceived severity, and benefits minus barriers are applied to chronic illness. The threat components of the model are perceived severity and susceptibility. The model assumption is that individuals will not take action unless the course of action is believed to be beneficial in reducing the threat and the perceived barriers do not outweigh the perceived benefits (Kasl, 1974).

Motivation to take necessary action is an added concept in the modified model for application to chronic illness. Motivation has been operationalized as the state of readiness to take specific action. Psychological readiness can occur due to: concern about health matters in general; willingness to seek and accept medical direction; intention to comply; and positive health activities. Kasl (1974) adds that illness behavior takes place in the presence of

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symptoms which may themselves provide motivation for compliance. In the original model and in Pender's model (1982), health behavior takes place in the absence of disease or symptoms and so the intervention issues are educating individuals and finding the appropriate cues for action, rather than motivation.

Given (1982) modified the health belief model in order to develop an intervention model for the management of chronic disease (Figure 2). The most significant alterations by Given are the inclusion of the client's decision not only to comply, but to assume responsibility for managing chronic disease, to take action necessary for disease management, and to improve health state. The model suggests that client involvement in all aspects of care is a major contributor to health outcomes. The model further suggests that client knowledge is a critical component that influences perceptions.

The Given model (1982), taken from the health belief model, is a framework to examine the variables of this study which are the hypertensive client's knowledge about the prescribed dietary regimen and perceived benefits of following the diet as they relate to compliance with diet through modifying eating behaviors and so contribute to improved blood pressure. Figure 3 illustrates the interrelationship of the variables to be studied.

Knowledge

According to the model in Figure 3, knowledge about diet therapy for sodium restriction and/or weight loss influences perception of benefits of the diet. Perceived benefits and knowledge influence the client's decision to assume responsibility to modify eating behaviors,

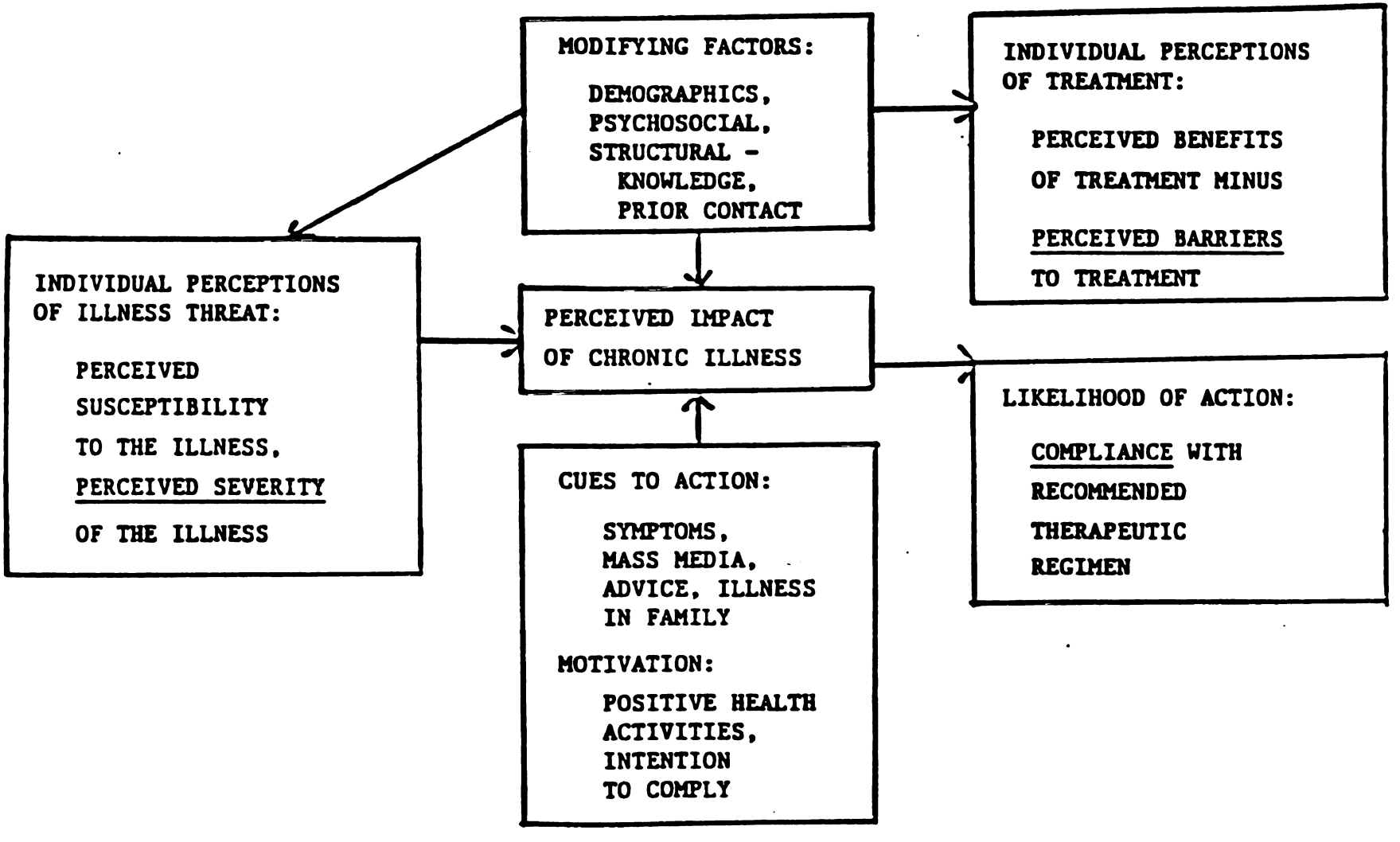

Figure 1

The health belief model adapted from Becker, 1974, and Kasl, 1974.

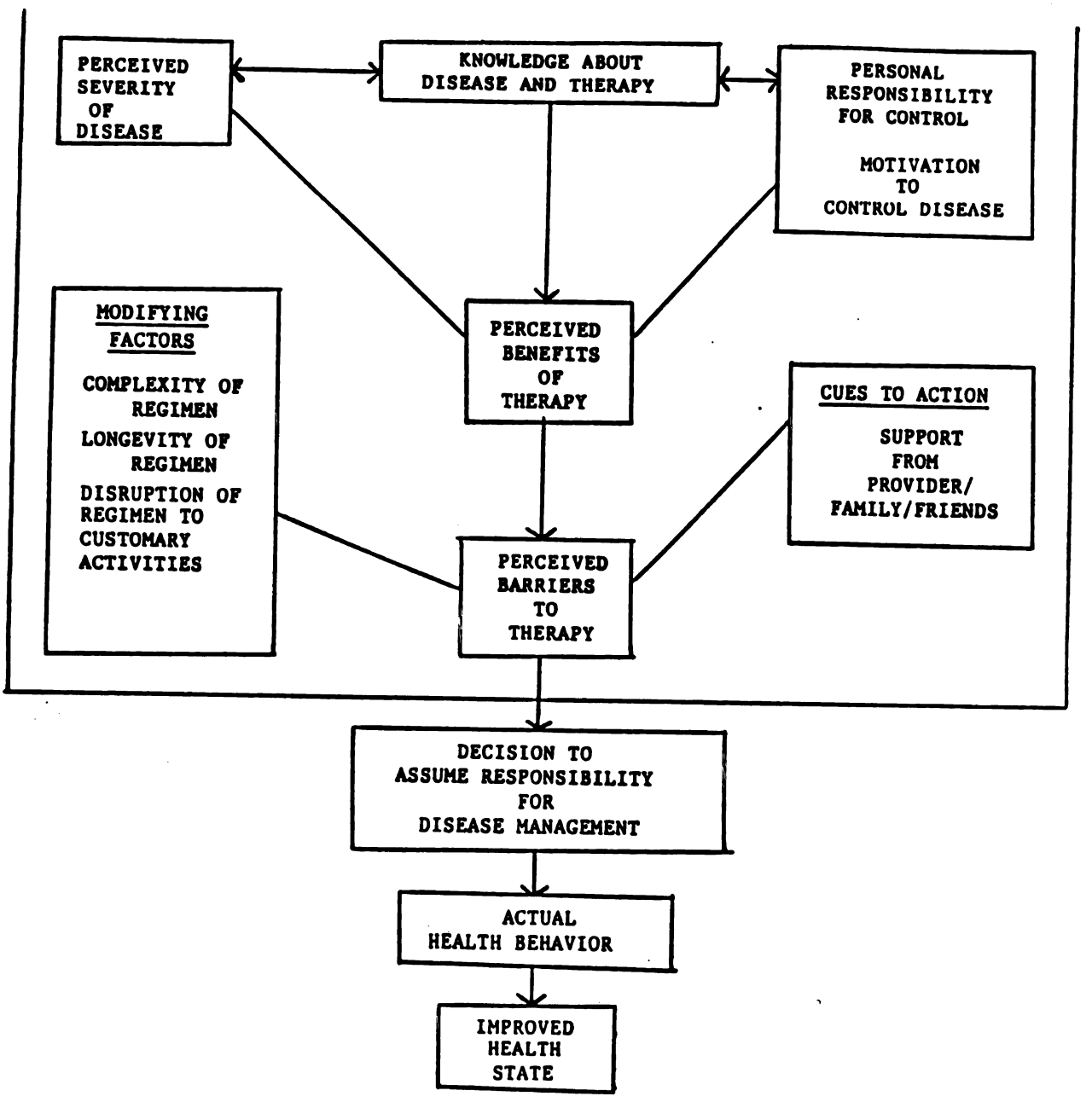

Figure 2

The health belief model modified by B. Given from the health belief model as a predictor of health behavior.

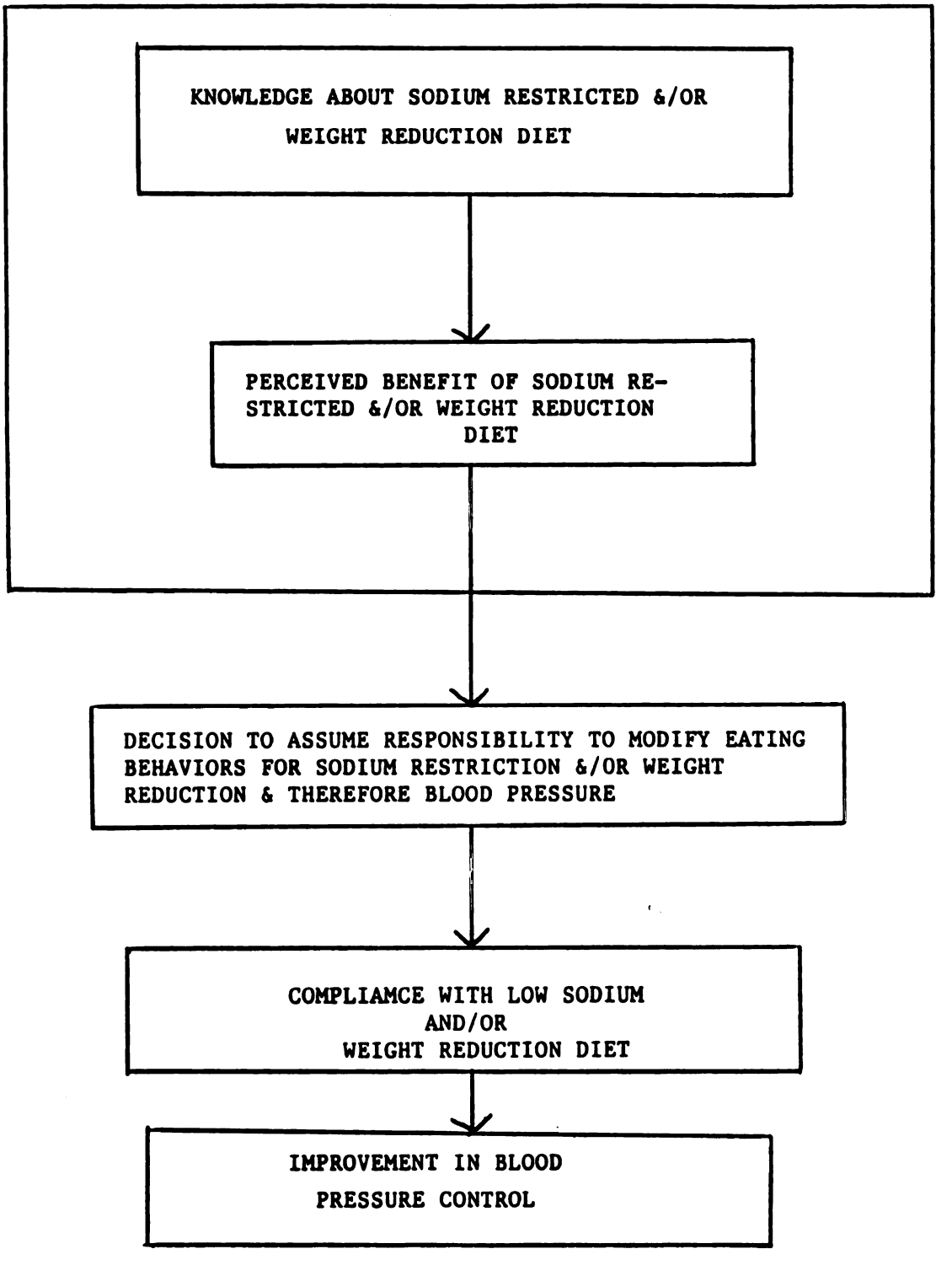

Figure 3

Adaptation of the modified Given model to the study variables.

to engage in the behaviors necessary, and ultimately, to blood pressure improvement.

Knowledge is the factual information the client recalls and reports when questioned about the treatment plan, including the dietary prescription (Given and Given, 1982). Although noncompliance is multifactorial, "possibly two-thirds of problems in compliance stem from faulty comprehension" of the therapeutic regimen (Blackwell, 1978; p. 46). Providing appropriate information about aspects of a therapeutic regimen seems to be critical for compliance. While knowledge alone will not guarantee compliance (Becker, 1979; Cummings et al., 1980; Miller, Wikoff, McMahon, Garret, & Ringel, 1982; Tanner and Noury, 1981) without understanding, compliance cannot take place except by chance (Becker, 1979; Blackwell, 1978; Kirscht and Rosenstock, 1977; Levy, 1982; Loustau, 1979; Loustau and Blair, 1981; Sackett et al, 1975; Wartman, Malitz, & Palm, 1983; Wyka, Levesquel, Ryan, & Maltea, 1980).

The National High Blood Pressure Education Program (1973) and the Working Group from the program (1979) established guidelines for hypertension education and specified information that should be included in any educational program for hypertension. Moore (1982) states that client education should be a component of the first step in any management program for hypertension. Monahan (1980) also delineates specific knowledge needed by hypertensives to control blood pressure and reiterates that while knowledge does not guarantee compliance, without it, the client cannot comply. The critical behaviors described by the Working Group (1979) expanded upon the original knowledge objectives and described the beliefs and skills the

client must have and the care the professional must provide to achieve blood pressure goals. The knowledge, beliefs, and skills delineated by the group did not, however, include dietary measures for the management of hypertension. In 1982, a Working Group on Critical Patient Behaviors in the Dietary Management of High Blood Pressure issued a report that did develop knowledge, beliefs, and skills critical for client compliance to diet along with intervention strategies to assist the client in developing the necessary behaviors (Working Group, 1982).

In summary, it is apparent that knowledge in terms of factual information alone is insufficient to alter adherence behavior but that it is critical for compliance behavior to occur. Educational programs that are successful in promoting adherence include strategies that assist the client to translate the knowledge into skills needed to overcome barriers to adherence, strategies to fit behaviors into the client's lifestyle, and strategies to alter perceptions concerning efficacy of treatment. Without adequate factual information, however, learning (translating knowledge into appropriate skills and beliefs) cannot take place (Blackwell, 1978; Bloom, Krathwohl, & Masia, 1971; Bowler, Morisky, & Deeds, 1980; Bowler and Morisky, 1983; Braithwaite and Morton, 1981; Fass, 1981; Glanz, 1980; Janz and Becker, 1984; Kostas, 1980; Levy, 1982; Loustau and Blair, 1981; McCombs, Fink, & Bandy, 1980; Mitchell, 1977; Sackett et al, 1975, 1978; The JNC, 1984; Wadsworth, 1971; Wollam and Gifford, 1978).

Knowledge alone does not assure appropriate beliefs, but it can effect beliefs. If the client has appropriate beliefs based on thorough and accurate information, the client may be more motivated to

develop the needed behaviors for blood pressure control (Given and Given, 1983; Given, C., Given, B., & Coyle, 1984).

Perceived Benefits

Perception or beliefs about benefits to dietary treatment involving sodium and/or weight restriction are also found in Figure 3. Perception about dietary treatment was selected for study to explore beliefs the client has concerning the efficacy of developing new patterns of behavior that are required to follow the dietary regimen.

Perceptions about benefits include the client's belief that a regimen is beneficial to improving health state and is essential to adherence (Given and Given, 1982, 1983). Several researchers suggest that perceptions concerning benefits of treatments are correlated with compliance, including dietary compliance (Becker et al., 1977; Cummings et al., 1982; Nelson et al., 1978; Taylor, 1979).

Becker (1979) in a review of twenty-five studies, found consistent correlations between beliefs about benefits and compliance. Levy (1982) stresses that it is critical to assist clients, through sound educational programs, to see benefits of the treatment regimen.

Given et al. (1978, 1984) found that clients with adequate knowledge had more positive beliefs concerning efficacy of medication and that both knowledge and perception of benefits correlated significantly with compliance. McCombs et al. (1980) state that clients' needs regarding benefits, as well as those regarding barriers, must be addressed to promote compliance.

Since beliefs about efficacy of low sodium and/or weight reduction diets are closely linked to knowledge as indicated by Figure 3, this research is directed at exploring if knowledge assists

clients in developing appropriate beliefs concerning benefits of diet and if knowledge and beliefs concerning benefit contribute to compliance.

Compliance

Compliance is defined as those behaviors the client performs at the suggestion of, with the encouragement of, or in agreement with the provider to maintain or improve health state (Given and Given, 1982, 1983). Compliance in this study is based on client self-report of engaging in behaviors to decrease sodium and/or calorie intake. Self-report is elicited concerning whether or not the dietary prescription was followed. No perfect method of measuring compliance is acceptable (Haynes et al., 1980; Hilbert, 1985; Nelson et al., 1978; Remmell, Gordon, Hall, & Tillotson, 1980; Remmell and Benfori, 1980; Rudd, 1979; Stunk and Waxman, 1981).

There is limited literature concerning dietary compliance. Glanz (1980) reviewed and synthesized dietary compliance studies and found that many are of poor quality and difficult to interpret. Dietary regimens are often only a part of a treatment plan for managing a chronic illness and the medical community is reluctant to manage nutritional problems. It is also difficult to measure and quantify valid information about dietary compliance and there is a conspicuous lack of a unified approach (Glanz, 1980).

Dietary compliance is a serious issue for health care providers working with hypertensive clients since it is becoming increasingly important as a sole treatment for some cases of mild hypertension. Low sodium and/or weight reduction diets are considered important additions to pharmacological treatment (JNC, 1984).

Glanz (1980) indicates that noncompliance with diet is even greater than that with medication. This is attributed to the fact that diet usually restricts behavior while drug-taking adds behavior, and diet is usually employed to control versus cure illness (Fass, 1981). Given et al. (1984) suggest that dietary adherence is difficult because it requires multiple decisions throughout the day, changing old behaviors, and commitment. Diet adherence requires long term behavioral change. The regimen may be incompatible with lifestyle and clients may lack the skills and knowledge needed, both of which contribute to the high rate of noncompliance (Glanz, 1986).

The term compliance is somewhat controversial. Some believe the term carries a connotation of a patronized, unreliable, deviant client, implying limitation in the client (Edel, 1985; Stanitis and Ryan, 1982). Others (Given et al., 1984; Linden, 1981) believe the term compliance involves client participation and follow-through and this implies a positive connotation. The terms adherence and compliance are used interchangeably in this study, with no difference in intended meaning. The term compliance is not meant to be judgmental. It is the most commonly used term in the literature, and compliance is the key concept utilized in the Index Medicus for literature related to the subject of the extent to which a client carries out therapeutic regimens.

Compliance and Improved Blood Pressure

As depicted in Figure 3, compliance with the dietary prescription for sodium and/or weight reduction is linked to improved blood pressure. Blood pressure is defined as the actual reading obtained using an average of readings on two separate occasions. A blood

pressure of greater than 140/90 mm Hg is considered as hypertension (JNC, 1984). Improvement in blood pressure for this study is a decrease in systolic and/or diastolic blood pressure that reaches statistical significance.

There is evidence from research that compliance with blood pressure regimens contributes to blood pressure control, but most are concerned with pharmacological treatment only (Nelson et al., 1978; Sackett et al., 1978; The JNC, 1984). Grim et al. (1985) found that clients who took medication and lost weight had the greatest decreases in blood pressure. Morisky et al. (1983) reported a strong correlation between diet, medication taking, and blood pressure control. Given et al. (1979) found that hypertensives who comply with treatment, including diet, have a significant improvement in blood pressure control.

As discussed earlier in the chapter, there is no doubt that therapeutic regimens for hypertension contribute to a decrease in mortality and morbidity. Medication regimens, especially the stepped care approach, has been demonstrated to contribute to blood pressure control. There is also ample evidence, as previously shown, that restricting sodium and controlling weight are important treatment modalities for hypertension management. However, unless the client complies, blood pressure control and reductions in morbidity and mortality cannot be fully realized. The client's knowledge and perception of benefits are closely related to each other and to compliance. Therefore, the health belief model is an appropriate framework to explore the relationship of these variables. The health belief model does not dictate intervention strategies (Janz and

Becker, 1984). The modifications of the model as presented in Figure 3, however, can be used to guide the nurse in the application of the nursing process for care of hypertensive clients.

Assessment, planning, intervention, and evaluation strategies can be developed for all components of the health belief model (Given and Given, 1983; Loustau, 1979; Reisler, 1983). This research is concerned with application of the nursing process to the concepts of knowledge about sodium and/or weight restriction diets and perceived benefits of diet to facilitate compliance to diet and, therefore, blood pressure improvement. The nursing process can be utilized by the nurse during interaction and transaction with hypertensive clients as described by King's goal attainment theory (1981).

Nursing Theory

Imogene King's (1981) theory of goal attainment has been adopted to provide the theoretical framework for application of the nursing process for hypertensive clients. King's theory can be used to demonstrate the relationship of the concepts of knowledge and perceived benefits about diet from the modified health belief model in Figure 3 to nursing care of hypertensive clients to promote compliance and therapeutic outcomes. The modified health belief model is a description of the relationship of knowledge and beliefs to the client's compliance behavior while King's theory focuses on the overall communication and decision-making process that influence that behavior.

Imogene King's original work (1977) was meant to propose a frame of reference for nurses to identify and analyze events in specific nursing situations and to demonstrate the relationship of a concept of

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health (which included illness and alterations in health) to nursing. King's proposed framework (1977), like her theory (1981), is a description of the concepts of social systems, perception, and interpersonal relations as well as health because "they apply to all human beings and represent to the author's sources of the conceptual base of the dimensions of nursing; that is, the physical, emotional, social, and intellectual state and capacity of individuals and groups encountered by nurses" (King, 1977; p. 21).

King suggests that since man functions in social systems, a theory for nursing must include man's interaction with the environment as well as the complex dynamics of human behavior. There are three dynamic interacting systems in King's theory (1981) that suggest the inter-relationship among individuals, groups, and society. The theory is a systems approach that was the basis of the original framework (1977). The approach relates human beings and nursing to personal, interpersonal, and social systems.

According to King, goal attainment is derived from interpersonal systems, whereby the nurse and client represent one type of interpersonal system. Concepts from the theory of goal attainment are: perception, judgment, action, reaction, interaction, and transaction. These concepts are congruent with the nursing process since the nursing process involves interaction between the nurse and client to determine needs, establish goals, develop strategies to achieve goals, implement interventions and evaluate effectiveness. The concepts are also related to the health belief model and may have a significant impact on compliance behavior.

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Perceptions about life events including benefits about treatment, are subjective representations of reality (King, 1981). The individual's awareness of objects, events, persons, and self gives meaning to experiences. Judgments of the value of objects and events is based on these perceptions. King suggests that action is based on judgment of reality. Verbal and nonverbal action involves a sequence of behaviors related to recognition of conditions, and efforts to control events.

Clients react as total organisms responding to their unique perception of the environment and experience including knowledge. Using the modified health belief model, the nurse may predict how persons will react depending upon perceptions of benefits to following treatment (such as a sodium and/or weight restriction diet). In order to develop strategies to increase compliance to treatment, the nurse must assess the hypertensive client's knowledge and perceptions about benefits of following the diet. Taking into account an individual's perceptions and beliefs about treatment is a means of acknowledging individual uniqueness, values, and expectations.

According to King, interaction is defined as a process of perception and communication between person and environment. As the nurse and client set goals, interaction occurs. During interaction, both the nurse and client bring knowledge, needs, goals, past experiences, and perceptions to the situation. These influence the judgments made and the decision-making process during interaction. King believes that individuals interact with each other and the situation according to goal identification.

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Transaction is viewed by King (1981) as an observable outcome in achievement of valued goals and is influenced by role expectation and role performance. Transaction involves bargaining, negotiation, and social exchange. Transaction is the communication with the environment that leads to goal attainment and is viewed as growth and development. The nurse promotes growth and development by facilitating the client's acquisition of knowledge and skills to maximize potential to achieve compliance with diet and to contribute to improved health state through blood pressure improvement.

During the process of perception, judgment, action, interaction, and transaction, the nurse assists the client to establish goals and discusses alternative measures for goal achievement. The nursing mode of goal attainment involves communication with the client for identification of goals and problem resolution. Figure 4 illustrates a diagram of nurse/client interaction based on King's theory (1981).

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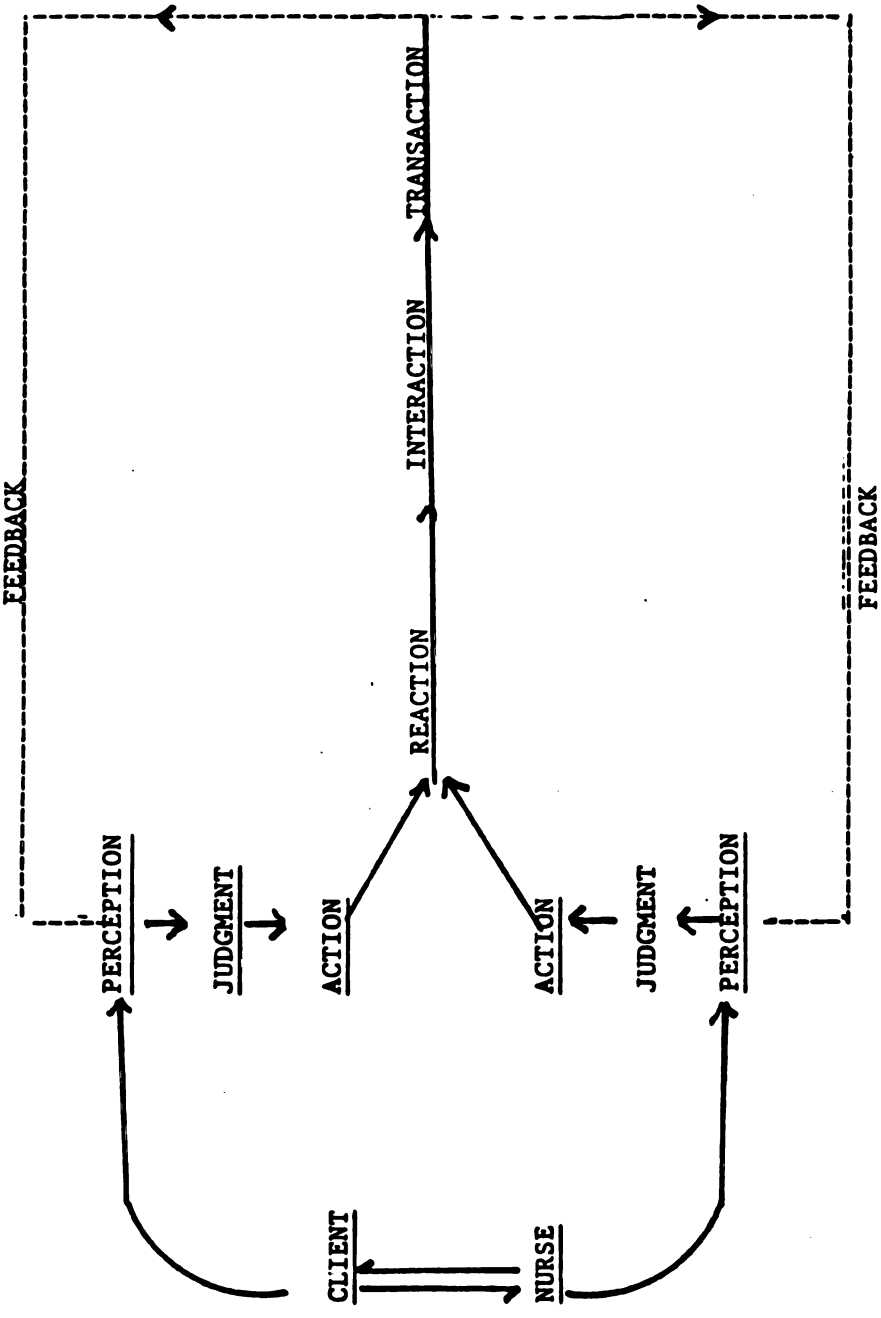

Figure 4

A process of human interaction, King, 1981.

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Nursing Intervention

The nursing diagnosis for the hypertensive client of noncompliance or potential noncompliance with diet is complex. Compliance means following the prescribed sodium and/or calorie restriction and engaging in the lifestyle adjustments that are necessary for following the regimen. 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. Using King's conceptual model, the hypertensive client and the nurse are mutual participants. Each brings to the nurse-client relationship perceptions, judgments, knowledge, skills and abilities. Each becomes part of the environmental experience of the other.

At the onset of King's process of human interaction (Figure 5), the client may act by saying, "I've been told my blood pressure is too high." A reaction by the nurse occurs, "Tell me more about your blood pressure." The process continues with assessment of the client's health status.

During assessment, baseline data is gathered. The client's current knowledge about dietary treatment for hypertension can be established. Assessment criteria may include asking the client to describe current dietary practices, including current salt use and calorie consumption. Assessment may also involve objective data such as serum and urine sodium levels, height and weight as well as blood pressure. If a diet has already been prescribed, the client can be asked to name the prescribed diet, to provide a twenty-four hour recall of dietary intake, and to indicate appropriate foods for the dietary prescription from a list.

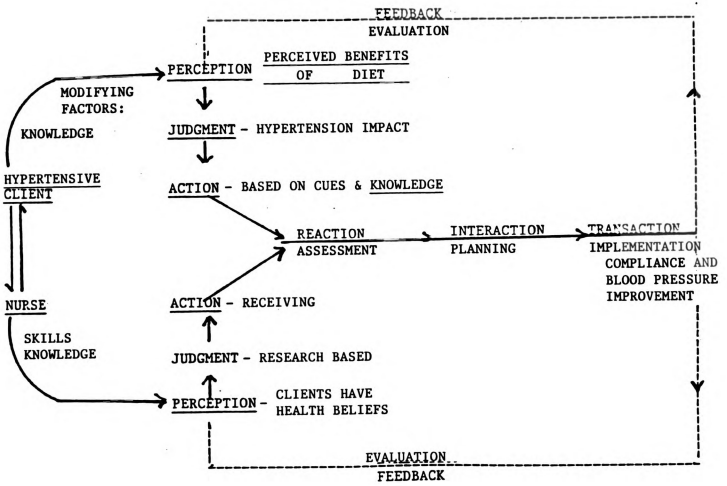

Figure 5

Combined model for the hypertensive client.

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The nurse can assess perceived benefits the client has about diet by asking if the client thinks the diet can or is contributing to blood pressure control and whether or not the client perceives that the benefits of diet compliance are worth the effort. Other components of the health belief model should also be included in the assessment process, such as perceptions concerning severity of hypertension, the threat that hypertension poses for the client, and potential barriers to dietary compliance. Date concerning ethnic background and its influence on diet is also important information to gather during the assessment process.

During interaction and the planning stage of the nursing process, the nurse and client collaborate to mutually identify dietary and blood pressure goals. Means to achieve goals are explored and strategies identified. Using the health belief model, the nurse can assist the client to learn the basic principles of dietary management using current knowledge levels as the basis for instruction. Providing the client with accurate information about the relationship of sodium and/or weight to hypertension may assist the client in developing the perception that dietary alterations are beneficial and worth the effort.

The nurse can assist the client to apply these facts to the client's life situation using the assessment data concerning current dietary practices and ethnic background. The client will also need skills in reading labels, preparing shopping lists, and in food preparation. The nurse may also assist the client to develop skills for self-monitoring such as using chloride titrator sticks for measuring urine sodium or recording weights. Establishing a criteria

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for measuring success should be part of the nursing intervention. If the client is experiencing other life changes, the nurse may want to assist the client in developing a plan for one dietary change versus several. This decision should also be based on assessment of current resources available to the client. Involving the client's support system may be beneficial at this point. The intervention stage should also include actions involving other aspects of the health belief model relevant to promoting compliance, such as basic information about the seriousness of hypertension and its complications. The nurse should also assist the client to develop strategies for overcoming obstacles to compliance that may have been identified during the assessment process. When the client can tell the nurse exactly how the plan will be implemented, transaction begins.

The outcome measures mutually established to indicate compliance behavior and improved blood pressure are used to evaluate effective transaction. Transaction occurs as the client makes each dietary change and participates in assessing success in making each change. According to King, compliance behavior and improved blood pressure are indicators of transaction. The process is repeated at each nurse-client intervention.

Summary

In summary, treatment for hypertension involves both pharmacological and nonpharmacological therapy. Nonpharmacological treatment includes sodium restriction and weight reduction for overweight hypertensives. In order for treatment to be effective, the hypertensive client must follow the dietary regimen. King's theory of goal attainment provides a nursing process framework into which the

components of the health belief model may be integrated for nursing care of hypertensive clients relevant to this study. King's theory outlines the interaction process whereby the nurse assesses the client's knowledge concerning dietary treatment for hypertension and perceptions concerning the benefits of diet. The nurse utilizes the data to provide appropriate intervention through instruction and mutual goal identification. Progress is evaluated using mutually established outcome criteria and the process begins anew.

The conceptual framework for exploring the variables of knowledge about diet, perceived benefits of diet, and the relationship of compliance to blood pressure improvement was the focus of this chapter. The concepts were presented within the context of the health belief model as modified by Given (1982). A combined model which demonstrated the relationship of the variables to nursing theory as delineated by King (1981) was also discussed. A review of the literature relevant to the concepts under study will be the focus of Chapter III.

CHAPTER III

Review of the Literature

Overview

Relevant literature pertaining to the study variables of knowledge about diet, perceived benefits of diet, compliance with diet, and the relationship of compliance with diet to blood pressure are presented in this chapter. Recent research findings applicable to the constructs of the study are reviewed. Included are research findings that involved nursing interventions relevant to the constructs. The chapter is divided into the following sections: the health belief model; knowledge and compliance; perceived benefits and compliance; compliance with diet; dietary compliance and blood pressure; measuring dietary compliance; and nursing intervention related to care of hypertensive clients prescribed a low sodium and/or weight loss diet.

The Health Belief Model

Client compliance with health care regimens has been a potential problem since the dawn of prescribed treatment. Compliance as an issue in health care has only been given serious attention since the development of treatments of established efficacy (Haynes, 1979). Noncompliance with treatment has an economic impact that cannot be ignored by health care providers (Connelly, 1984). Noncompliance contributes to health care costs by increasing the incidence of preventable diseases, prolonging illnesses, increasing the severity of disease, and contributing to complications that may lead to longer and more extensive treatment and precipitate the need for costly

hospitalization. Therefore, the issue of compliance is of critical interest to nurses since nurses are the largest group of health care providers in the United States.

The health belief model is a framework for investigating the issue of compliance. There is a description of the model and its reformulation for application to chronic illness in Chapter II. The reformulated model has been used as a framework for several compliance studies (Andreoli, 1981; Cerkoney and Hart, 1980; Champion, 1984p Cummings, Jetta, & Rosenstock, 1978; Cummings et al., 1982; Devon and Powers, 1984; Given and Given, 1982; Given et al., 1978, 1984; Given, B., Given, C., Gallin, & Condon, 1983; Given, B., Given, C., & Simoni, 1979; Glanz et al., 1981; Greene et al., 1982; Hershey et al., 1980; Kirscht and Rosenstock, 1977; Maiman et al., 1977; Morgan et al., 1983; Wyatt, 1980).

Constructs of the model have been examined for validity and reliability in predicting compliance with various regimens by several authors (Champion, 1984; Maiman, Becker, Kirscht, Hafeman, & Drachman, 1977; Sackett et al., 1976; Taylor et al., 1979; Wyatt, 1980). Unfortunately, measurements of the constructs were neither consistent nor always available among these authors and so findings were inconsistent and difficult to compare. A consistent conclusion of these reviewers, however, is that the constructs of the model are useful in examining the issue of compliance. An exception to this opinion is that the model studies show few observable effects on compliance and that it lacks operational specificity (Leventhal, Safer, Cleary, & Gutmann, 1980). Although Becker (1974) recommended standardization of question construction to measure the dimensions of

the model and standardization of analysis of findings to facilitate comparisons, this suggestion does not appear to have been followed.

In spite of these problems, Janz and Becker (1984) in an extensive review of 29 health belief model studies concluded that there is very substantial evidence supporting the health belief model as explaining and predicting health behavior. These authors computed significance ratios for each dimension of the model based on the studies reviewed. Perceived benefits, a variable in this study, had the highest significance ratio for explaining sick-role behavior (81%). The authors recommended that although the health belief model has been shown to explain and predict health behavior, tools should be standardized and definitions of each dimension operationalized. Janz and Becker (1984) also point out that since the model is a psychosocial formulation, it is limited in its ability to account for the variance in health related behaviors. Other factors also have and influence in explaining these behaviors. One such factor, another variable in this study, is knowledge.

Knowledge and Compliance

Expert opinion by several authors is that knowledge about the therapeutic regimen is related to compliance (Blackwell, 1973, 1978; Cummings et al., 1980; Kirscht and Rosenstock, 1977), but that the relationship is not necessarily causal (Anderson, 1982; Becker, 1979; Becker and Maiman, 1980; Fass, 1981; Given and Given, 1983; Glanz and Scholl, 1981; Moser, 1982). Becker (1979) and Becker and Maiman (1980), in a review of the compliance literature, found that data regarding client knowledge and compliance was neither clear nor

consistent, but that lack of knowledge about the prescribed regimen seemed to be a major contributor to poor compliance.

Glanz and Scholl (1981) reviewed 18 studies that used educational strategies to increase compliance with treatment regimens. The findings were that the studies involved a wide variety of sample sizes, most had clients over 50 years old, most involved blacks, and most involved low income groups. All but one took place in a clinic setting versus a private practice setting. None of the eighteen studies reviewed specified the exact nature of the intervention. These limitations led the authors to conclude that findings from the research could not be generalized to broad populations and that replication would be difficult.

Sackett et al. (1975), in an early study, used a stratified, randomized, control trial that included an educational program as an independent variable to examine compliance among 245 hypertensive, Canadian steel workers. The educational treatment (done by a non health professional) consisted of an audio-visual tape about hypertension, the effects of hypertension, the benefits of treatment, and the need for compliance. The measure of compliance was taking 80 percent of prescribed medication based on pill counts. Although the information increased participant knowledge, there was no impact on compliance. Validity of the negative results was reinforced by the fact that compliance rates bore no relationship to knowledge about hypertension either at entry or at termination. The finding is difficult to generalize since the sample was all male from a specific population.

A finding from a quasi experimental, before and after study with observations among a control and experimental group of physicians and hypertensive clients conducted by Inui, Yourtes, and Williamson (1976), was that clients who were more knowledgeable about their treatment and dietary prescriptions were more compliant with medications ($p<.005$). The participants were not more compliant, however, with either diet or appointment keeping. This study was not specifically designed to examine the effects of knowledge on compliance, but rather to examine the effect of tutoring physicians about compliance problems and how to intervene using the constructs of the health belief model.

Bille (1977) studied education along with the role of body image as an independent variable in compliance among a voluntary convenience sample of all male patients in two hospitals. Compliance was assessed using a telephone interview one month post hospitalization. The instrument used to assess knowledge was a researcher designed test with an internal consistency of .645. Only post test measures were obtained. A finding was that there was no significant relationship between the amount of knowledge and reported compliance. Data were obtained from only ten of the original 34 interviewed. Findings are, therefore, difficult to generalize.

Given et al. (1979) reported findings from a record review of 103 out-of-control hypertensives over a five month period in a family practice setting. Client knowledge was found to be positively related to compliance ($p=.05$). When the relationship between the combined effects of diagnostic processes, compliance, and knowledge was

examined, the relationship was also significant ($p=.05$). In this descriptive study, compliance was associated with knowledge.

Morisky and colleagues have reported data over several years on the results of what was originally defined as a test of educational strategies to improve compliance and blood pressure control. The original study (Morisky et al., 1980) used a factorial design to examine the effects of three educational strategies among 400 ambulatory low and high risk hypertensive subjects. There were eight combinations of the three interventions and a pure control receiving regular care. The three strategies were an exit interview of five to ten minutes to provide counseling, education, and tailoring of the regimen, two home visits (one to assess knowledge and the other to educate and involve a family member), and a group problem solving activity. The measure of compliance was medication taking and appointment keeping.

The only significant finding for the main effect was that the lower risk subjects assigned to the small group activity had a higher proportion of compliance scores than the high risk group ($p=.04$). Participants receiving any intervention kept a greater proportion of appointments ($p<.01$). Another reported success was that the groups exposed to any educational intervention had significantly better blood pressure control ($p<.001$). In 1982, Morisky reported that the main effects persisted stating that 16 percent of those exposed to any intervention still kept appointments and had blood pressure control ($p<.01$). However, neither medication nor diet compliance was reported as being significantly effected except in those clients over 65 ($p=.02$). Morisky et al. (1983) also examined mortality data and

stated that the mortality rate was 57.3 percent less for the group receiving any educational intervention ($p<.01$). After five years, there was no statistical difference between the experimental and control groups in compliance, but the experimental group continued to demonstrate better blood pressure control ($p<.01$).

It is extremely difficult to interpret the findings reported from the studies conducted by Morisky and colleagues. It is not clear whether any or all of the interventions were ever repeated. Glanz and Scholl (1981), Becker (1979), and Becker and Maiman (1980) state that there is evidence from studies that educational interventions rarely persist over time. Although several findings were reported by Morisky and colleagues over an extensive period, few that were significant seemed to involve many participants. There was no indication in the reports by these researchers as to how medication compliance was measured or what criteria was used for appointment keeping. Regression toward the mean concerning blood pressure was not addressed and since the control group had a 20 percent improvement in blood pressure, some effect seems obvious. The sample used also limits any generalizations since it was 91 percent black, 70 percent female, and low income. The mortality findings, however, were interesting.

Kirscht (1983) was both skeptical and intrigued by the data from the reports by Morisky and colleagues. The study did indicate something happened that produced an effect, but a basic question remains unanswered: were the effects created by the intervention? Although the interventions did not seem potent, the experimental group did have better blood pressure control and the results could not be explained by attrition. Kirscht (1983) further states that the

mortality results are astounding. Although the study provides evidence that educational interventions can have a long term effect, failure to provide reinforcement of any of the strategies over the five years makes it difficult to cite the continued impact of the intervention.

Hafeman and Madison (1980) conducted a pilot education program in a hypertensive clinic to determine if the program could result in weight loss. Sixty-four men and women, who were taking approximately the same dose of diuretic, were randomly assigned to an experimental and control group. The intervention was two, one-hour dietary educational sessions. Weights were compared from onset to eight months following the intervention. More than 71 percent of those in the experimental group lost weight compared to 34.4 percent in the control group ($p<.025$). The researchers found that education can help hypertensives lose weight. However, bias was a real possibility in this study since the intervention group received more attention from the investigators. The data were also contaminated when some of the control group took the classes. No pre and post test measures were done concerning the educational intervention so one cannot conclude that an increase in knowledge contributed to weight loss.

Wyka et al. (1980), in a pre and post test study of 54 random subjects from 710 at a Veteran's Administration medical outpatient clinic, examined the effect of group education on behaviors appropriate to blood pressure control. Outcome criteria included a diastolic blood pressure less than 90 mm Hg, ideal body weight or loss of three kilograms, and other health related behaviors. Accomplishments of any four was rated as a plus one with a maximum

score of four. The intervention consisted of five weeks of classes, one and one-half hours each. Mean scores on the post test were significantly improved in the education group ($p<.001$). Mean significant changes also occurred in the outcome criteria ($p<.001$). There was evidence from this study that education can bring about significant changes in both knowledge and outcomes. The evidence should be considered in view of the fact that the scoring of the outcomes was somewhat arbitrary and reliability and validity of the measures was not addressed. Group assignment was also arbitrary and the population from which the sample was obtained were all Veteran Administration clients.

In another study, Webb (1980) examined the effects of three, one-hour educational sessions that included the importance of diet and compliance, on actual compliance with the prescribed regimen. Participants in this study (103, low income, rural blacks) were assigned to either a treatment group or a control group that received three usual physician visits. The compliance measures consisted of appointment keeping, bringing medications, and pill counts. Analysis of variance of mean change scores, t tests, and Chi square analysis were done and there were no significant differences between the groups. The authors concluded that the medical care the clients received was already of high quality which may have contributed to no observed effect. Perhaps the compliance measures were not reliable or valid considering the focus of the educational strategy although this issue was not addressed.

Swain and Steckel (Steckel, 1982; Steckel & Swain, 1977; Swain & Steckel, 1981) reported findings from a three by four repeated

measures of analysis of variance design involving 115 randomly selected and assigned clients to test the effects of three modalities on knowledge, adherence, and blood pressure. For this study, adherence was defined as staying in treatment and appointment keeping. The three modalities were education (providing the subjects with three booklets to read after a pretest), contingency contracting along with the booklets, and routine clinic care (the control). The contract group had 100 percent adherence. Knowledge was significantly higher in this group ($p<.0001$) as was adherence ($p<.001$). Diastolic blood pressure also significantly improved ($p<.05$) when compared to either the education alone group or the control group. There was evidence from this study that education by itself does not significantly contribute to compliance or to diastolic blood pressure improvement. However, the same information was included in the contract group. Although the authors conclude that education alone does not increase compliance or knowledge, perhaps it would be more appropriate to say that written material alone does not have an impact. Clients in the education group were not asked if they had even read the materials before given the post test.

Tanner and Noury (1981) conducted an exploratory study to test the effect of instruction provided in biweekly visits for four months on compliance. These authors measured compliance as blood pressure control. There was no significant difference found in the 15 who participated in the intervention from the 15 who did not in terms of blood pressure control. Although the intervention group did demonstrate a significant decrease in diastolic pressure (p .05), none were less than 90 mm Hg. The intervention group did score

significantly higher on the knowledge post test (p=.05). Included in this study was yet another measure of compliance, this time limited to an outcome only. Neither reliability nor validity of the measures were addressed by the authors. Although the participants did not obtain control as defined by the authors, blood pressure did improve as did knowledge. Nothing can be concluded about a possible relationship between knowledge, compliance, and control since these were not tested.

The only longitudinal study reviewed was conducted by Glanz et al. (1981) with further data analysis by Kirscht (1981). The study was conducted over three years among 422 private practice clients in northern Michigan to assess client response to educational interventions and how responses related to compliance. The four educational strategies, sequentially introduced, were written materials, nurse phone calls, self-monitoring, and social support. These were described in detail by the authors. A major finding was that although the clients viewed the interventions as positive, none were found to be related to improved adherence and none of the interventions persisted over time. The compliance measures in this study included both self-report for medication and diet and pharmacy scores for medications along with appointment keeping. A finding from this study was that education does not influence adherence. Knowledge, however, was not measured. The data were obtained from a sample that consisted of white, rural, blue collar workers (60 percent had a high school education and 78 percent were over 50) and there was no control group for comparison.

Zismer, Gillum, Johnson, Becerra, & Johnson (1982) used blood pressure as a measure of the efficacy of an educational program among 50 subjects drawn randomly from 156 clients in a medical practice primarily serving blacks of low to middle income. The 39 who agreed to participate were assigned to one of three groups. Group one consisted of education in pill taking, appointment keeping, and a low sodium diet. Group two included the same strategy, but involved a family member. Group two was later dissolved due to difficulties in family participation and was combined with group one. The control group received usual care. The blood pressure decrease in the education group was significantly greater than in the control group ($p<.001$). Findings as a result of this study were the opposite of those reported by Tanner and Noury (1981). Knowledge itself, however, was not tested and the intervention called education may have differed in the studies as it has in most of those reviewed.

Cummings et al. (1982) used both stated compliance and clinical outcome measures to examine the effects of knowledge. There was evidence from this study, although involving dialysis clients and not hypertensives, that demonstrates the problems associated with using different measures. In this group of clients, knowledge of the purpose of the treatment regimen was significantly related to a serum phosphorus level ($p<.05$), but not related to self-report of compliance. Knowledge concerning diet specifically was not associated with either self-report of dietary compliance or serum potassium levels and weight. Results from this study are difficult to generalize because it was conducted among hemodialysis clients. The participants in this study were not very knowledgeable about the

prescribed treatment regimen either at intake or at the conclusion of the study.

In summary, there is evidence that indicates knowledge does influence compliance for some groups and not others depending upon the strategy called education and upon the measures used for compliance. Strategies varied significantly from formal classes to the presentation of information in written form only. Others involved client and/or family participation. Compliance measures included self-report, pill counts, appointment keeping, and physiological parameters such as weight, blood pressure, and lab values. None of the studies reviewed were of true experimental design.

Implications of the Review

Only two of the studies reviewed (Glanz et al., 1981; Inui et al., 1976) had results concerning the relationship of knowledge to dietary compliance among hypertensives. Based on the general inconsistencies in findings among researchers examining the effect of knowledge on compliance, the inconsistencies in strategies and measurements, further research is needed before conclusions can be made concerning the relationship between knowledge and compliance. This study is, therefore, important since data was analyzed to study not only the relationship of knowledge about diet to compliance with diet, but also the relationship of knowledge about diet to beliefs about the benefits of diet among a sample of hypertensives.

Given and Given (1983) state that although knowledge alone does not ensure appropriate beliefs, it becomes the basis for developing such beliefs. If knowledge can effect beliefs than those clients who have accurate and comprehensive knowledge should be more highly

motivated to develop the behaviors needed for blood pressure improvement including the necessary behaviors for adhering to the dietary prescription.

Perceived Benefits and Compliance

Perceived benefits of treatment, like knowledge, has been measured in a variety of ways. The studies reviewed do not have consistent measures of the construct. The outcome measures for compliance also vary and include many of the same measures as in the knowledge studies.

According to the health belief model, perceived benefits are the individual's determination of the action in terms of efficacy and feasibility and is weighed against perceived physical, psychosocial, or financial barriers (Rosenstock, 1974). Becker (1979), in a comprehensive review of the studies using the health belief model, states there is a positive correlation between the level of perceived benefits and compliance while perceived barriers usually are associated negatively with compliance. Mikhail (1981) in a later review supports this statement as do Janz and Becker (1984) after a review of 29 studies. Cummings et al.(1978) in a study to test construct validity of the health belief model, found that perceived benefits and barriers demonstrate a strong negative correlation ($r=-.655$) suggesting that as perceptions of benefit increase, perceived barriers decrease and so may be opposite ends of the same continuum.

In the study by Kirscht and Rosenstock (1977) involving 132 randomly selected hypertension, benefits were defined as belief that treatment would decrease severity of the complications associated with

hypertension and as "feeling healthier." Using Chi square analysis, a significant ($p < .05$) and positive correlation was found between perceived benefits and medication taking measured by self-report and pharmacy records, but was not related to compliance with diet. There was a great deal of missing data in this descriptive study that was not accounted for in analysis.

Using a prospective study design to examine mothers' adherence to diets for obese children, Maiman et al. (1977) did, however, find that the belief that diet would help with weight loss was significantly associated with dietary compliance. The measure of compliance in this study was actual weight loss. The assumption by the researchers was that the weight loss resulted from adherence.

Nelson and colleagues (1979) also examined perceived benefits in relationship to compliance among 142 hypertensives selected randomly on the basis of appointment day. Perceived benefits were defined as avoiding the threats posed by hypertension, but it was not clear how this was measured. Compliance was measured based on self-report of never having missed a dose of medication in the past 28 days, keeping 80 percent of appointments, and having a diastolic blood pressure less than or equal to 90 mm Hg. Dietary compliance was not examined in this study. Although perceived benefits were not associated with self-reports of compliance, or appointment keeping, they were associated with blood pressure control.

Using a survey design among 85 hypertensives with 45 percent responding, Johnson (1979) found just the opposite. Among this group, although 50 percent had definite fears concerning the threats of hypertension complications, clients who perceived treatment benefits

were more likely to be in poor control ($p<.02$). Blood pressures were obtained from chart review.

Based on a convenience sample of 84 hypertensives and examining all the dimensions of the health belief model using an instrument with alpha coefficients ranging from .41 to .45, Watt (1981) found that 100 percent of this group perceived benefits of a no added salt diet and 96 percent viewed medication as beneficial. Among this group, only 17 percent had any compliance difficulty, but only medication compliance was examined. Blood pressure was not utilized as an outcome.

Compliance with diet as well as medications in relationship to perceived benefits along with other constructs from the health belief model was also examined by Cummings and colleagues (1982). However, this study was among hemodialysis clients. Measures of compliance, discussed in the previous section, included therapeutic outcomes such as laboratory values and weights as well as self-report. Among the findings in this study were that beliefs about benefits of diet strongly correlated to self reports of compliance ($p<.05$, alpha coefficient .92), but there was no correlation to the clinical outcome measures.

O'Connell, Price, Roberts, Jurs, and McKinley (1985) also found perceived benefits of diet to be significantly related to compliance with diet. This study did not include hypertensives, but included a convenience sample of 100 nonobese and 69 obese adolescents using a questionnaire. Perceived benefits had a reliability coefficient of .83 in predicting dietary behavior.

In sum, there is evidence from the literature that individuals are more likely to comply with various recommendations if actions are

thought to be effective in preventing, detecting or treating disease (Mikhail, 1981). The studies have many inconsistencies in terms of defining benefits and compliance. It is also evident from this review that findings concerning the relationship of the constructs are also inconsistent.

Implications of the Review

Considering the data available from the literature, this study is needed to contribute to evidence concerning the relationship of perceived benefits of diet to dietary compliance. The health belief model components of perceived benefits and knowledge have been measured in a variety of ways and correlated with a variety of compliance measures. There is evidence that these constructs are important to examine in relationship to compliance with therapeutic regimens, including diet. Among the studies reviewed, only the research by Given and colleagues (1978), specifically analyzed data to examine the relationship of knowledge to perceived benefits of treatment. The clients in this study were 88 hypertensives in a family practice center. Both knowledge and perception of benefits were correlated with compliance ($p<.05$), and with each other ($p<.05$). Among the participants, those that complied two-thirds of the time had blood pressure control ($p<.05$). Data concerning dietary compliance was not included in this study, but if the results are correct, there is a need to discover if there is a relationship concerning knowledge about diet and perceived benefits of diet to compliance and to each other, and whether or not dietary compliance is related to blood pressure improvement.

Dietary Compliance

Glanz (1979, 1986) states that compliance with dietary regimens is poor and a growing problem for health care providers since modified diets are being prescribed for control of many chronic conditions. Further, many of the compliance problems occur because diets are often only one aspect of a complex regimen, diets do not provide noticeable symptom relief, diets may interfere with family functioning, and diets often pose other barriers such as cost, skill, time, and effort in preparation.

Certain characteristics of dietary treatment present unique problems for dietary compliance. Diets are usually restrictive while medication taking is additive and the new behavior must be applied in many situations. Diets are often of indefinite duration and are usually associated with control versus cure of disease (Glanz, 1980).

The Working Group on Critical Patient Behaviors in the Dietary Management of High Blood Pressure (1982) states that change in eating habits is one of the most difficult problems for hypertensive clients and often other life situations take priority over the effort needed to change eating behavior. The Working Group outlines critical behaviors needed for clients to decrease sodium intake and/or weight and have provided professional guidelines to foster the necessary self-management behaviors for diet adherence. Among the guidelines are providing appropriate knowledge and perceptions of benefits so that clients are both able and willing to make the necessary life style changes.

Researchers conducting studies related to sodium restriction and weight loss in the treatment of hypertension have demonstrated that

dietary management is an important aspect of the therapeutic regimen. However, while many of the studies mentioned the fact that compliance was a problem, most of the medical research has not dealt with the issue. Glanz (1980) states that much of the data regarding the determinants of dietary compliance are of poor quality, difficult to interpret, and do not adequately address chronic illness.

Glanz (1980) reviewed and synthesized the dietary compliance studies. Compliance rates for cardiovascular disease were found to range from 13-76 percent. The large discrepancy was related to the fact that there have been so many inconsistencies in the compliance measures. Glanz further states that the weight loss research has not resulted in much useful information concerning compliance. Most of those studies involved only small sample sizes, had high attrition, and relied mostly on voluntary participation. Both long and short term studies continue to be discouraging with consistently poor results with regard to outcomes. Further, it is difficult to compare findings due to inconsistencies in design and measurement. Diet compliance measurements have ranged from self-reports, to laboratory measurements of nutrients, to outcome measures such as weight loss and blood pressure. Measurements of dietary compliance need to be reproducible, valid, representative, and feasible (Glanz, 1980, 1986).

The determinants of dietary compliance, based on Glanz's review of the literature, are inconsistent. Generally, demographic characteristics have not been consistent predictors. A longer duration of treatment has often been associated with poor compliance as was the degree of lifestyle change imposed. Knowledge was not found to be sufficient for diet compliance, but four studies did have

data that indicated a positive association between the two constructs. The health belief model, while only partially adequate in predicting dietary compliance, was found to be somewhat successful among hypertensives in predicting compliance with low sodium and low calorie diets (Glanz, 1990, 1986).

Four studies concerning weight loss compliance and locus of control were reviewed. Three used clients enrolled in a formal weight reduction program (Goldney and Cameron, 1981; Muhlenkamp, 1981; Wineman, 1981). The other (Gierszewski, 1983) used a convenience sample from a large insurance company sponsoring a weight loss program. The data from these studies were inconsistent. While Wineman found no association between weight loss and locus of control, the remaining researchers found a positive association. If one assumes weight loss is an indicator or dietary compliance, than the conclusion is that locus of control is not a consistent predictor.

Another study concerned with weight loss was conducted by Behn and Lane (1982). The purpose of the study was to evaluate the effectiveness of a weight loss manual that combined nutrition education and behavior modification. The 20 participants were recruited through a newspaper advertisement. Eight of the participants were given the manual only. The remaining 18 had the manual plus four, two-hour nutrition classes. Both methods were significantly related to weight loss ($p<.025$); however, when a weight reduction index was used, only those who participated in the classes had significant weight loss. The group which received the manual and no further instruction also had significantly more attrition ($p<.01$). This study had several serious limitations in that sample size was

small and participants were neither randomly selected nor assigned. Attrition was 22 percent in the group provided with the weight loss manual as the only intervention and 14 percent in the group that received the manual along with the nutrition classes. This was not addressed by the authors and it represents a serious problem with regard to any weight loss program.

When Morisky et al. (1983) retrospectively examined weight as an outcome variable in the study previously discussed concerning educational intervention for hypertension compliance, all those who participated in any of the interventions (a five-ten minute exit interview, home visits, and small group problem solving) had an overall weight decrease of 1.5 pounds which was significant ($p<.01$). The group receiving traditional medical care from primary physicians had an overall weight increase. Another finding was a significant correlation between appointment keeping and weight control ($p<.01$). Compliance with diet and weight loss were not reported. The limits of this study have been discussed elsewhere.

Atkinson, Russ, Ciaverella, Ousley, & Bibbs (1984), like Behn and Lane (1982), also reported findings from a comprehensive weight loss program that included nutrition education and behavioral modification. Two variables added to this program were increased activity and psychological support. This study was also one of the few longitudinal studies concerning weight loss programs. After four years, 39 percent of participants were still active. Average weight loss for this group was 21.4 kilograms with an average time in the program of 12.1 months. There was support from the data in this study

that compliance with weight loss diets is complex and requires several interventions.

In an attempt to determine if there were any demographic, social, psychological variables to success with weight loss programs, Jeffery et al. (1984) examined correlations of these factors among 99 middle aged men. Measures were collected before and after a 15 week intervention program and again three months and one year post intervention. Principal findings were a strong inverse relationship between prior participation in an organized weight loss program and both short and long term weight loss, an inverse relationship between weight loss and spouse participation, and a positive association between weight loss and perceived social support.

In summary, as Glanz (1980, 1986) states, studies concerning dietary compliance are of poor quality, inconsistent in both methods and measurement, and rarely address chronic illness. There does not seem to be any consistent predictor for who will or will not comply with weight loss diets and little scientific evidence concerning useful interventions that might be applicable to a large variety of clients. Conspicuously missing are any experimental studies that examined the impact of a given strategy. There does, however, seem to be evidence that most individuals do better if ongoing support is provided as well as nutrition education and skill development for behavioral change. The effects of providing such intervention were evaluated in this study by the examination of the relationship between knowledge and compliance before and after a nursing intervention to promote compliance with hypertensive regimens, including weight loss diets.

Studies concerning compliance with other types of dietary prescriptions have many of the same limitations as those concerning weight loss. The information that follows is a review of those studies that examined compliance with other dietary regimens, some of which include, but are not limited to weight loss.

Kirscht, Kirscht, & Rosenstock (1981) assessed dietary adherence among 400 hypertensive clients under the care of private physicians in a small community using self report as the measure. There were 198 clients on diets (47 percent restricted sodium and 41 percent low calorie). None of the four interventions tested (printed tabloids, self monitoring of blood pressure, nurse phone calls to address problems, and nurse home visits to involve family members) increased dietary adherence. The limits of this study have been discussed elsewhere.

Kaplan (1982) and Sloan (1985), in an uncontrolled study of 78 mostly black and elderly poor hypertensives, evaluated the effectiveness of using chloride titrator sticks to measure adherence to a low sodium diet on actual adherence. The outcome measure in this study was a drop in sodium chloride excretion as well as a decrease in blood pressure. After six months 68 percent of participants (assigned to the experimental condition based on appointment day) did have a decrease in urine sodium excretion when compared to the control group. Statistical significance was not reported for this finding.

In a similar study, Luft et al. (1984) used a random crossover design among 32 participants to examine the effect of home use of chloride titrator sticks on compliance with a low sodium diet. Thirty percent of participants had a significant decrease in sodium intake as

measured by urine sodium excretion (p .01). Although neither Kaplan nor Luft conducted controlled experiments, both studies had results that indicate feedback improves compliance behavior with low sodium diets.

Another study was found that included information concerning dietary compliance related to hypertensive clients. Jeffery et al. (1983) compared the effect of individual counseling and group treatment on weight and sodium reduction for hypertension prevention. Ninety-three overweight adult males were randomly assigned to each group. The dietary intervention was a diet to decrease weight by 10 percent and reduce sodium to 70 milliequivalents per day. Both groups (which were statistically similar before intervention) had significant weight loss and sodium excretion as well as a decrease in blood pressure ($p<.05$) suggesting that either strategy is useful to promote dietary compliance.

Using three intervention techniques for comparison, Nugent and colleagues (Nugent, Carnahan, Shiehan, & Myers, 1984) also examined methods to increase compliance with diet among hypertensives. The three interventions, provided over the course of one year, consisted of instruction provided by nurses, intensive dietary counseling by dieticians, and counseling and support from psychologists. Compliance was measured using 24-hour urine sodium excretion. While the participants in the groups managed by the dieticians and psychologists were significantly more informed than the nurse-managed group, there were no significant changes in either sodium excretion, blood pressure, or weight among any of the participants.

Three studies that included data to examine the dimensions of the health belief model and diet compliance were reviewed. Cummings et al. (1982) conducted a study of dietary compliance among clients in two outpatient dialysis units. The study has been discussed elsewhere. Measures of dietary compliance included both self report and objective measures such as laboratory data. The significant predictors of dietary compliance among these clients (using $p<.05$) were perceived susceptability to complications ($r=.22$), belief in benefits of diet ($r=.56$), and support from the medical staff ($r=.25$). The significant negative correlations to dietary compliance were barriers to following the regimen ($r=-.54$) and family problems ($r=-.27$). Although this study was concerned with compliance among hemodialysis clients, the results have implications for other clients with chronic health problems, including hypertension. There was evidence from the study that interventions to increase perceived benefits of diet and decrease barriers could improve compliance, and that support from both nursing and family members may be an important component of strategy.

Haviland (1982) conducted a descriptive study to examine the effect of a specific component of the health belief model on dietary compliance: perceived barriers as they relate to social stressors. The participants were 71 middle-aged hypertensive women. Significant relationships were found between barriers to dietary compliance and the social stressors of parenting ($r=.57$), homemaking ($r=.41$), singlehood ($r=.57$), and finances ($r=.24$). These findings are supportive of those by Cummings et al. (1982) and suggest that further

research is important to examine factors that may effect long term adherence.

Given et al. (1984) also examined dimensions of the health belief model in relationship to dietary compliance as part of a study among 256 hypertensives to examine the impact of active client participation and persuasive communications on changes in beliefs and behavior. Among the findings were that the intervention did not have a significant impact on commitment to diet. It is the data from this study that was further analyzed to determine if two specific components of the health belief model (knowledge about diet and perceived benefits of diet) were related to each other or to dietary compliance and ultimately improvement in blood pressure.

In sum, the studies reviewed have various measures of compliance. Some researchers used self report (Glanz, 1979; Haviland, 1982; Kirscht, 1981; Remmel et al., 1980) and some used self report and other indices such as weight loss and/or laboratory parameters (Cummings et al., 1982; Given et al., 1984) and some used only objective parameters (Atkinson, 1984; Behn and Lane, 1982; Kaplan et al., 1982; Luft et al., 1984; Morisky et al., 1983; Sloan, 1985 and others). Due to measurement inconsistencies, it is difficult to compare findings. The studies generally have results that indicate compliance with diet is related to many factors and so responds to many interventions.

Implications of the Review

Based on the literature review, there is a need for further research concerning factors that contribute to dietary compliance. Glanz (1986) states that dietary nonadherence is a serious health care

problem that requires further research as to causes and solutions. The possible relationship of two variables (knowledge and perceived benefits) to dietary compliance among participants in a nursing intervention to promote client participation in care was examined in this study. The study results are, therefore, additive to the current information concerning the relationship of these two variables to dietary compliance. Another factor that was examined in this study is whether or not adherence to a low sodium and/or weight loss diet was related to an improvement in blood pressure. The next section is a review of current evidence concerning this relationship.

The Relationship of Low Sodium and Weight Loss Diets to Blood Pressure

While there were no clinical trials found of substantial size and rigor that had results indicating dietary treatment of hypertension in decreasing morbidity and mortality, evidence was found from several studies that non drug interventions, including diet, lower blood pressure (Kopelman and Dzau, 1985). Andrews, MacMahon, Austin, & Byrne (1982) used meta analysis to examine 37 of the studies to compare pharmacological and nonpharmacological treatment of mild hypertension. Thirteen of the studies that focused on weight reduction were determined to be of high quality and had results that indicated weight loss produced the most significant mean decrease in blood pressure.

Weight reduction and sodium restriction are the two cornerstones of prevention as well as nonpharmacological treatment of hypertension (Gillum et al., 1983). The Joint National Committee (1981) reported that there is a strong correlation between weight and blood pressure

and that weight reduction is a reasonable first approach to treat uncomplicated mild hypertension and as an adjunct to the treatment of all overweight hypertensives. In 1979, the National High Blood Pressure Education Program (NHBPEP) stated that there was considerable information that the two most promising aspects of dietary management that may contribute to control for some clients and decrease the need for drugs in others were weight reduction and sodium restriction.

The Working Group on Critical Patient Behaviors in Dietary Management of Hypertension (1982) concurs and also supports the Joint National Committee recommendations. The group states that diet may be considered definitive treatment if blood pressure decreases and the decrease is maintained. Diet should be considered as adjunctive treatment for all hypertensives since it lessens drug side effects due to the possibility of reducing client cost for the purchase of medication. Dietary treatment also enhances the effect of drugs used to treat hypertension (Margie and Hunt, 1981).

Several studies by medical researchers concerning the effects of sodium and calorie restriction on blood pressure were reviewed. The studies varied significantly in design and methodology. The issue of compliance was rarely addressed. Results from the studies for both weight loss and sodium restriction vary in outcome as to the effect on blood pressure.

Sodium Restriction and Blood Pressure

Sixteen studies were reviewed that were concerned with the effect of sodium restriction on blood pressure. Of these studies, six were concerned with the impact of weight reduction concurrently (Anderson et al., 1984; Fagerburg, Anderson, Isaksson, Bjorntorp, 1984; Gillum

et al., 1983; Hunt and Margie, 1980; Jeffery et al., 1983; Maxwell, Kushiro, Dornfield, Tuck, & Waks, 1984).

Hunt and Margie (1980) examined weight loss retrospectively in a descriptive study among 3000 subjects on seven different regimens including medication. The researchers found that sodium restriction was most effective in those that lost an average of 12 pounds. Jeffery et al. (1983) and Gillum et al. (1983) also found the effects of weight loss and sodium restriction were additive ($p<.05$). Maxwell et al. (1984), on the other hand, concluded that weight loss and not sodium restriction had the most impact on blood pressure. None of these four studies were scientifically controlled experiments. Fagerburg et al., (1984) and Anderson et al. (1984), in randomized trials also found that weight loss decreased blood pressure only when sodium was also restricted ($p<.05$).

The remaining ten studies that examined the impact of sodium reduction alone had different results. Only two of the studies were double blind, randomized trials that compared placebos to controlled sodium intake (MacGregor et al.,1982; Watt et al., 1985). These two studies had exactly contradictory results. Whereas MacGregor and colleagues found a significant impact on blood pressure among participants adding controlled amounts of sodium ($p<.001$), Watt and colleagues found no difference between the placebo group and the subjects ingesting sodium. Both of these studies were of short duration and sample sizes were small.

Five of the studies were randomized trials with control data, either from pure controls or from sequential design (Beard, Lever, Robertson, & Semple, 1982; Morgan et al., 1978, 1979; Parfrey, 1981;

Richards, 1984; Silman, Mitchell, Locke, & Humpherson, 1983). Beard et al. (1982) and Morgan et al. (1978, 1979) included subjects taking medications for hypertension. Morgan and colleagues found that sodium restriction had a significant effect on blood pressure only compared to control subjects ($p<.05$), and not when compared to those subjects taking either thiazide diuretics or beta blockers. Beard and colleagues found that sodium decreased blood pressure additively with medications and a significant number of participants ($p<.001$) on sodium restricted diets, could reduce medication dosage or stop taking medications.

There was evidence from the studies conducted by Kaplan et al. (1982) and further examined by Sloan (1985) and the study by Luft et al. (1984) that there is a relationship between compliance with a sodium restricted diet and improvement in blood pressure. Kaplan and Sloan both reported that participants that decreased urine sodium excretion by one third or more (the measure of compliance) had significant decreases in blood pressure. Luft found a significant inverse correlation to urinary sodium excretion and blood pressure ($p<.05$).

In sum, there is evidence from the literature that sodium restriction can contribute to a decrease in blood pressure. Based on a review of the research, Brown et al. (1984) concluded that currently, the evidence is insufficient to make recommendations for widespread use of nonpharmacological measures as a sole treatment for some hypertensive individuals one way or the other. In spite of the findings, several experts (Egan and Julius, 1984; Hodges and Rebello, 1985; Hunt, 1983; Kaplan, 1985; Wilbur, 1982) believe that the best

available evidence does suggest a strong link between sodium and hypertension, especially in some individuals. The findings, inspite of questionable study designs with little or no control measures and small sample sizes (Brown et al., 1984), validate the NHBPEP (1974) recommendations to include sodium restriction in the treatment of hypertension. This study, although not of experimental design, examined the relationship of compliance (measured by self report only) with low sodium diets to improvement in blood pressure and so contributes to evidence regarding that relationship.

Weight and Blood Pressure

There is considerable evidence documented by Chiang, Perlman, and Epstein (1969), in a comprehensive review of the literature, that there is a relationship between weight (especially obesity) and hypertension. These authors concluded that from 20-33 percent of individuals with hypertension are overweight. The interrelationship of weight and hypertension is a real and independent of arm circumference as confirmed by intra-arterial and cuff blood pressure levels (Chiang et al, 1969). Kopelman and Dzau (1985) agree that the relationship between weight and blood pressure is well established. The following review is a summary of recent studies supporting this relationship.

Rigorous studies concerning the impact of weight reduction on blood pressure levels are limited in numbers. Among the studies reviewed, there were no double or single blind experiments. Only one of the randomized studies had a control group that was actually managed the same as the treatment group with the exception of the specific intervention under study (Reisen et al., 1978). Ramsey, L.,

Ramsey, M., Hettiarachchi, Davies, and Winchester (1978) and Tuck, Sowers, Dornfeld, Kledzik, and Maxwell (1981) used randomized designs but had treatment groups only. Only Tuck et al. (1981) controlled in design for sodium intake, but in this study, both of the treatment groups ingested less sodium than the average American (Kaplan, 1985). There was evidence from all three of these studies that weight loss significantly correlates with a decrease in blood pressure.

The remaining studies were descriptive and retrospective (Dawber, 1980; Eliahou, 1981; Heyden et al., 1985; Langford et al., 1985; Management Committee of the Australian Trial, 1982; Stamler et al., 1978; Velasquez and Hoffman, 1985). However, all had results that indicated weight is correlated to blood pressure improvement for most clients whether they are taking antihypertensive medications or not. None of the scientific studies had significance levels of less than $p=.05$.

Hovell (1981) critically reviewed 21 of the intervention studies in terms of strength of measures and experimental design. Six of the 21 were found to be methodologically sound, but only one was a randomized clinical trial that tested the effect of weight reduction on the pharmacologically treated hypertensive. None of the studies reviewed had explicit reliability checks for either blood pressure or weight. Only seven used comparison groups and only three random allocation. Non-random control procedures are subject to selection bias. Hovell reported that the Reisen study (1978) was the most scientifically sound. None of the studies had information concerning long term effects of treatment. In spite of these findings, Hovell concluded that weight reduction should be considered a reasonable

first step in the treatment of overweight, mild hypertension and as adjunctive therapy for all overweight hypertensives. Several other experts have agreed that weight reduction should be a critical component of a treatment regimen for all overweight hypertensives (Havlik et al., 1983; Kaplan, 1985; Sims, Phinney, & Vaswani, 1978, 1982; Tobian, 1978).

In summary, although the studies concerning the relationship of weight and hypertension are not scientifically vigorous, they do provide fairly strong evidence that a relationship exists. There is also sufficient evidence that weight reduction, with or without sodium restriction, lowers blood pressure. Based on the review of research concerning dietary intervention for hypertension, there is evidence from the literature that both sodium restriction and weight reduction are efficacious in the treatment of hypertension. Even though morbidity and morality data were not available, nonpharmacological treatment, with or without medications, lowers blood pressure and so should be considered part of the treatment regimen for hypertensives.

Implications of the Review

In this study, the relationship of diet compliance for sodium restriction and weight reduction to blood pressure improvement was examined. Further, two factors that may influence compliance behavior with diet were also explored. No treatment, whether pharmacological or dietary, can be efficacious in lowering blood pressure if the client does not comply. In spite of treatment, there are a large number of hypertensives who are not controlled (Cummings et al., 1982); Haines and Ward, 1981; The Joint National Committee, 1985; Thomson, Alderman, Wasserthiel, Rafter, & Samet, 1981), suggesting

there is a need for research that examines factors related to compliance with prescribed treatments, dietary or pharmacological. Evidence from such studies can be used to improve the nation's health.

Measuring Dietary Compliance

Measuring compliance behavior is difficult. From the previous discussion of research concerning the relationship of knowledge and compliance, perceived benefits and compliance, and compliance with diet, it becomes evident that several measures have been used. The inconsistencies in these measures make it difficult to compare findings among studies. Glanz (1986) states that whatever measure is used, it should be reproducible, valid, representative, and feasible. The purpose of the following review is to examine information available on appropriate measures of compliance.

The Joint National Committee (1980) states that blood pressure is only one indicator of adherence to treatment. Dunbar (1980) and Gordis (1979) state that indeed, therapeutic outcomes do not necessarily constitute a measure of compliance. In fact, Adams and Leverland (1985) suggests that blood pressure measurements, in particular, are influenced by a wide variety of factors including climate, body, and extremity position, activity and overall exercise patterns, alcohol use., weight, tobacco use, and stress. While compliance and physiological response may be related, they cannot be considered interchangeable (Dunbar, 1980).

Self report of compliance was the measure used in this study. Research that used client interview as a measure of compliance has resulted in information that many noncompliers can be identified using this relatively inexpensive, although indirect method, even though

clients tend to overreport compliance and underreport noncompliance (Gordis, 1979). Dunbar (1980) agrees, and points out that those who who do report noncompliance most likely are. Several other authors also agree that self report is a reasonable method to measure compliance (Dudley, 1979; Rudd, 1979, 1980, 1986; Haynes et al., 1980; Dzuna, 1981; Rudd, 1979; Sackett, 1980; Stunkard and Waxman, 1981).

Dietary compliance is particularly subject to reporting errors because the behaviors are less discernable. Dietary recall requires memory and accuracy on the part of the client. Recall is usually quite difficult and while diet records improve accuracy, they may influence compliance and so confound research results (Dunbar, 1980).

The research that has included data to examine the reliability and validity of self report, usually do correlations between two measures. For instance, Haynes, et al. (1980) found that self report significantly correlated to pill count ($p=.0001$) among 135 hypertensives studies over six months. Hilbert (1985) found a significant correlation ($p<.001$) between self reported and judged compliance among a group of 60 male myocardial infarction clients. Mittlemark and Sternberg (1985) reported that there was a high degree of agreement between stated and observed salt use among 211 individuals in two cafeterias although no statistical tests were applied to the data. Hyman et al., (1982) assessed comparative validity of laboratory methods and self report for compliance with fat controlled diets and found that data from 164 clients showed a significant correlation between the two ($p<.05$).

Most recently, Morisky, Green, and Levine (1986) conducted a three year study to determine the validity of a self reported measure

of medication adherence. The findings, using a structured four-item, Likert scale, with an alpha coefficient of .61, were that the scale has both concurrent and predictive validity. Seventy-five percent of the clients who scored high on the four item scale at year two had adequate blood pressure control at year 5 compared to 47 percent under control for those who scored low ($p<.01$).

In sum, the literature concerning compliance measures is limited. Many of the studies discussed elsewhere do not include reliability and validity data concerning the measures used. Authors have generally found that the interview to obtain self reports of compliance is satisfactory, economical, and feasible and there is scientific evidence that it is a fairly valid measure. In fact, the interview can provide information about compliance behavior that neither chemical assays or other objective measures can yield since appropriate questioning can provide information about the level of compliance, its consistency, its patterns, and any obstacles that might exist (Glanz, 1986).

Implications of the Review

The measure of compliance with low sodium and/or weight loss diets in this study was self report. The data that was obtained during the original intervention study was indeed used to identify compliance problems and to develop strategies to promote dietary adherence. Weight was also examined as a possible objective measure of dietary compliance. Due to retrospective design, it was not possible to include objective measures of sodium intake to validate stated compliance with low sodium diet.

Nursing Intervention

Nursing intervention studies relevant to the constructs of this study are limited. Several of the studies concerning the relationship of knowledge and compliance were conducted by nurses (Bille, 1977; Cerkoney and Hart, 1980; Given et al., 1979; Given and Given; 1983; Hafeman and Madison, 1980; Korhanen et al., 1983; Powers and Powhaten, 1982; Steckel, 1982; Steckel & Swain, 1977; Swain & Steckel, 1981; Tanner and Noury, 1981; Webb, 1980; Wyka et al., 1980). The results of these studies, reported elsewhere, indicate that nurses are excellent providers of educational information necessary for blood pressure control. Nurses are thought to be excellent providers of the education clients need to adhere to hypertensive regimens and several nurses have developed assessment, intervention, and evaluation tools for providing such education although they may not have been scientifically tested (Long, Winslow, Scheuhing, 1976; Loustau and Blair, 1981; McCombs, 1980; Monahan, 1980, 1981; Resler, 1983; Resler and Bovington, 19893; The Working Group, 1982; Young, 1986).

Nurses have also conducted studies concerning the health belief model. Although the model, used as a framework for this study, does not provide intervention strategies, it has been used to develop and test nursing interventions (Champion, 1984; Lousteau, 1979; Mikhail, 1981). The constructs of the model, including perceived benefits and knowledge, provide potentially modifiable links to compliance behavior (Becker, 1979).

Several nursing authors have addressed the issue of compliance in their nursing practice (Connelly, 1984; Daniels and Kochar, 1980; Foster and Kousch, 1981; Hellenbrand, 1983; McCord, 1986; Padrick,

1986). Although the recommendations from these authors were not based on research the authors conducted, all state that adherence is an important issue for nursing and one that responds well to application of the nursing process.

Another issue addressed by nursing to promote compliance is the relationship of client participation in care. The study from which the data used in this research were obtained was one that had data relevant to client participation (Given and Given, 1982). In other research, Shulman (1979) found that hypertensives who actively participated in the treatment program, were more likely to contribute to therapeutic outcomes. The conclusions are based on 99 randomly selected hypertensives assigned to either an educational intervention, contracting, or routine care. Only the group of clients who scored high as participants in care achieved blood pressure control ($p<.05$) and also were significantly more likely to report compliance ($p<.002$). Those who scored high in participation also were more likely to believe in the appropriateness of care ($p<.001$).

The studies by Swain and Steckel (1977, 1980, 1982), discussed elsewhere, had findings that contracting, which involves client participation, resulted in 100 percent adherence. Contracting is also considered to be an effective way to foster compliance by several other nursing authors (Brykczynski, 1982; Fass, 1981; Moughton, 1982; Stroebel and Gluek, 1981).

Conway-Rutkowski (1982) reviewed the compliance literature to determine the relationship between client participation in the nursing process to compliance. The author concluded that more research is needed to design a client centered approach to care and to achieve

goals inherent to compliance. More information is also needed to appropriately educate nurses to fulfill the obligation as a partner in therapeutic alliance with the client.

In sum, nursing research has been conducted related to the health belief model in general and to explore the relationship of educational interventions to compliance. Studies involving nursing intervention to foster compliance behaviors through client participation in care have also been conducted. Noticeably lacking from the nursing research are studies that specifically address dietary adherence for hypertensive clients. Dietary adherence was included in the studies conducted by Given et al. (1979) and Given and Given (1982). Further analysis of this data was done for this study to examine whether two components of the health belief model (knowledge and perceived benefits) contribute to dietary compliance.

Information concerning adherence to diet is important to nursing since the Working Group on Critical Patient Behaviors in the Dietary Management of Hypertension (1982) charges nurses with facilitating client outcomes for each step of the necessary dietary changes for restriction of sodium and weight reduction. These behaviors include providing appropriate information about hypertension and the benefits of treatment and involving the client in each step of the assessment, planning, intervention, and evaluation process. Margie and Hunt (1981) and Ecklerleng and Kohrs (1981) state that nurses are excellent providers of education as well as motivation for promotion of the necessary dietary changes.

Noncompliance is both ethically and economically important to nursing. It is frequently a consequence of failure of the

professional to develop an effective alliance with the client and failing to explain self care behaviors. Attention must be given to the uniqueness of the individual, the individual's knowledge base, and perceptions as the nurse facilitates acquisition of the necessary self care skills through communication, negotiation, instruction, and support (Connelly, 1984).

Summary

Relevant literature pertaining to the study variables of knowledge about diet, perceived benefits of diet, compliance with diet, and the relationship of compliance with low sodium and/or weight loss diets to blood pressure was the focus of this chapter. Nursing research that focused on compliance interventions was also reviewed. There is evidence from the review of the available research that further studies are needed concerning the concepts. The methods for examining the variables of knowledge, perceived benefits, and compliance as they related to diet among a sample of hypertensive clients prescribed either a low sodium and/or weight loss diet are presented in Chapter IV.

CHAPTER IV

Methodology and Procedures

Overview

A retrospective, descriptive survey design was used in this study to identify and describe the relationship between knowledge of diet, perceived benefits of diet, stated compliance with diet, and blood pressure improvement among participants in an experimental nursing intervention. Data for this study were collected as part of a federally funded hypertensive and diabetic research project, Patient Contributions to Care--Link to Process and Outcome, grant #5R01NU00662, conducted by B. Given and C. W. Given. The project, funded by the Public Health Service, Division of Nursing, was conducted in four ambulatory care sites in Michigan.

The study design for the original project was a controlled field experiment in which the effects of a six-month nursing intervention on clinical and psychological parameters and other indicators of management and control of hypertension were explored. Data collected at intake and termination were used for analysis of the variables in this study. The descriptions in this chapter of the population, sample, instrument development, data collection procedures, and human rights protection are, therefore, those used in the research project.

Research Questions

Question 1. Is there a relationship between client knowledge about diet and perception of benefits of diet to stated compliance with diet before and following an experimental nursing intervention? Specifically:

Question 1a. Is there a relationship between client knowledge scores about diet and diet compliance scores before and following an experimental nursing intervention?

Question 1b. Is there a relationship between client perceived benefits of diet scores and diet compliance scores before and following an experimental nursing intervention?

Question 1c. Is there a relationship between client knowledge scores about diet and perceived benefits of diet scores before and following an experimental nursing intervention?

Question 2. Is there a relationship between client stated compliance with diet and blood pressure improvement before and following an experimental nursing intervention?

Population

A population of hypertensive clients was identified at the four ambulatory care sites by two methods. In the three family practice centers, staffed by family practice residents, data contained in a computerized health information system was employed. In the fourth site, which consisted of two private practice offices staffed by four internists, client lists were drawn up from recall by the physicians.

Population criteria for inclusion in the study specified that clients had to: 1) be between the ages of 18 and 65; 2) have an established diagnosis of hypertension; 3) be literate; 4) show no evidence of cancer, end-stage renal disease, stroke, blindness, or psychosis; 5) not be pregnant or lactating; and 6) be on a prescribed diet and/or medication regimen for hypertension. The medical records of the hypertensive clients also had to include: 1) two elevated blood pressure readings taken at least two months apart; 2) name of

medication(s), dosage, and date prescribed and/or type of diet prescribed; and 3) two weight measures taken at least two months apart.

Four-hundred thirty-three client records were originally screened at all sites for hypertension. Of these, 177 were excluded by the co-principal investigators during a second screening. The majority, 124, were excluded because the blood pressure fell below the limits set to define hypertension as out of control: a systolic blood pressure of 140 mm Hg or a diastolic blood pressure of 95 mm Hg. The remainder had physiological or psychological problems which excluded them from the study.

Sample

The second screening of the potential participants in the study conducted by trained auditors and the principal investigators resulted in a sample of 156 hypertensives who met all the study criteria. Letters were sent to each of the eligible participants that described the purpose of the study, its potential benefits, the length of time and requirements for participation, and a disclaimer that refusal to participate would not jeopardize care they were currently receiving (See Appendix A).

Subjects willing to participate were asked to return a postcard. A name and telephone number was also provided for those who might want additional information. Follow-up on all letters and postcards was done via telephone by an interviewer. During this time, the study was again described and questions answered. One hundred fifty-eight clients, aged 24 to 65, agreed to participate and completed an intake interview and were enrolled in the study. The final sample was

voluntary and not randomly selected so results of the study can only be generalized to hypertensive clients who possess characteristics similar to those of this sample.

Experimental and Control Group

At the conclusion of the intake interview, the clients were assigned to either an experimental or control group. It had been anticipated that no more than 50 clients would be selected per site for the study, so an array of 54 numbers were randomly ordered. Assignment was achieved by consulting a table of random numbers from 1 to 100 and randomly selecting 54 numbers. Once the random array was selected, the numbers were assigned to the experimental and control group clients using a two-thirds/one-third split favoring assignment to the experimental condition. A description of how clients were selected and assigned to the experimental and control groups appears in Figure 6.

Subjects in the experimental group (n=109) were asked to meet a nurse intervenor eight times over a 6-month period. The goal of the intervention was that the nurse and client collaborate to identify a plan and specific strategies to involve the client in carrying out the health behaviors needed to follow the therapeutic regimen. All materials for the intervention phase were standardized and systematized to facilitate use by nurse intervenors at each site. Extensive documentation by the nurse enabled staff to analyze the context and focus of each visit and insured consistency among the intervenors. The format and activities of the nurse/client interventions that took place over the eight visits is described in Figure 7.

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Assignment to the control group did not involve participation in a specific nursing intervention. The subjects in the control group received usual health care from their providers. Providers for both the experimental and control clients were asked to complete a form with information regarding health status and current therapeutic regimen at each visit to the provider for the duration of the intervention period. The eighteen who were lost from the experimental group (those missing more than one-half of the outcome measures) were not included in the outcome analysis. Chi square analysis indicated attrition was not related to the experimental condition nor to any of the sociodemograhic variables. The final sample for analysis in this study were the subjects assigned to the experimental group who were prescribed a diet to restrict sodium and/or reduce calories.

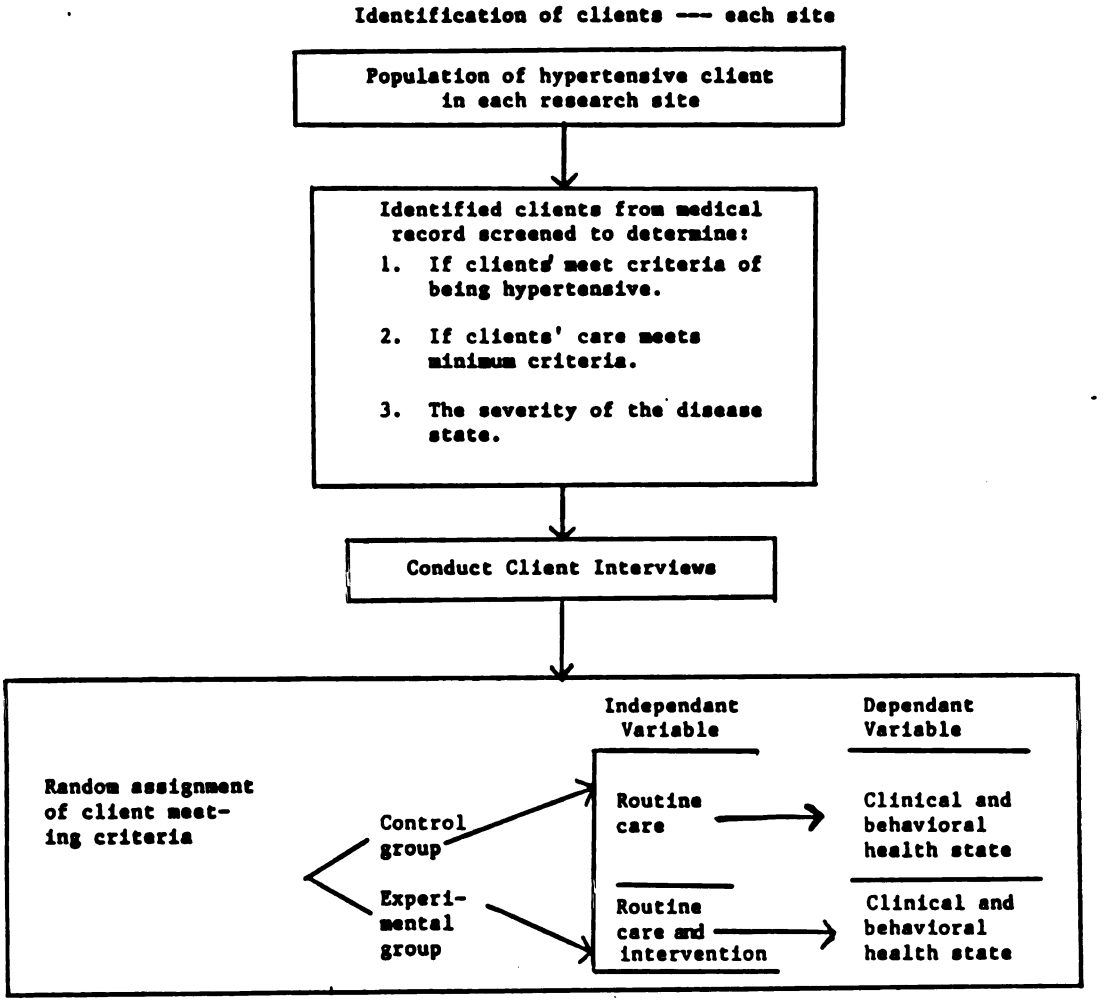

Figure 6

Client identification, participation, and assignment (experimental phase), Given and Given, 1982.

Visit One/Visit Two

1. Client identifies (recognizes) problems in taking medications/following diet.
2. Nurse and client set goals for overcoming problems.
3. Nurse and client identify solutions for problems.
4. Nurse graphs weight, blood pressure (blood sugar).
5. Client receives focus on beliefs about diet and medication-taking.
6. Nurse and clients focus on beliefs about diet and medication-taking.

Visit Three/Visit Four

1. Nurse and client identify barriers to problem-solving.
2. Client and nurse identify strategies for solving problems.
3. Nurse and client state what client support person(s) and nurse will do to solve problems.
4. Client and/or nurse identify new or unsolved problems.
5. Client evaluates compliance and ability to achieve goals.
6. Client sets new goals.
7. Client selects new alternative solutions.
8. Nurse graphs weight, blood pressure (blood sugar).
9. Client receives information on specific aspects of therapy, drugs, and diet.

Visit Five/Visit Six

1. Nurse reinforces successful strategies.
2. Nurse and client introduce new strategies.
3. Nurse emphasizes benefits of medications and diet and success in overcoming problems (barriers).
4. Nurse introduces exercise and its benefits.
5. Client and nurse identify new goals.
6. Client and nurse set strategies to solve problems related to exercise.

Visit Seven

1. Client evaluates ability to achieve goals and progress made.
2. Client and nurse identify new problems.
3. Client and nurse identify strategies for solving problems.
4. Client receives information on complications, extent of control.

Visit Eight

1. Nurse assures client how he/she can continue on his/her own.
2. Nurse will be available but client and nurse will not meet on regular basis.
3. Client and nurse evaluate effectiveness of program and progress made.

Figure 7

Nurse/Client intervention visits. Given and Given, 1982.

Operationalization of the Study Variables

Knowledge

Knowledge about diet is defined as the cognitive resources available to the client to describe the dietary regimen. Knowledge is the factual information the client can recall and report to specific questions concerning diet including purpose, acceptable and unacceptable foods, and/or levels of caloric intake (Given and Given, 1982, p. 26).

Knowledge concerning dietary treatment of hypertension was measured using the scores from the instrument, Understanding High Blood Pressure (Appendix C). A high score on the instrument was indicative of a high level of factual knowledge concerning diet.

Benefits

Perceived benefits of treatment is defined as the expressed beliefs and attitudes of the client concerning the benefits to undertaking aspects of the therapeutic regimen (Given and Given, 1982, p. 27). Efficacy of dietary treatment was measured using a total of seven items developed by Given and Given on the Commitment to Diet scale (Appendix C).

The Commitment to Diet scale was developed because the original reliability studies on the scale to measure beliefs concerning perceived benefits of diet and barriers to following diet (Appendix C. Beliefs) failed to confirm that clients had distinct cognitive beliefs concerning barriers and benefits. The original scale had adequate levels of internal consistency but were highly interrelated suggesting they were similar constructs (Given and Given, 1982) and the items did not discriminate between the two. This finding was supported by

Cummings et al. (1978) who found that perceptions of benefits and barriers demonstrated a strong negative correlation (r=-.655) suggesting that the two constructs may represent opposite ends of a single continuum and so should not be treated as separate health beliefs.

The format used for measuring the beliefs concerning commitment to diet was a questionnaire using Likert-type responses ranging from "strongly agree" to "strongly disagree." Respondents recorded their level of agreement with each item describing the concepts. A high degree of perceived benefits was ascertained by assigning a numerical score to each possible response so that a high degree of benefit and a low degree of barrier to diet was indicative of high commitment to diet. Both positively and negatively worded statements were sued to prevent response bias. Also included in the measurements were beliefs concerning the benefits of treatment for hypertension in general. Those beliefs were measured using the subscale, Efficacy of Treatment (Appendix C). A high score on this subscale was indicative of belief that treatment for hypertension is beneficial.

Compliance

Compliance with the dietary treatment is defined as the extent to which the client carries out the therapeutic recommendations of the health care provider concerning diet (Given and Given, 1982, p. 28). Compliance with diet and medications was measured using the Hypertension Client Interview (Appendix C). The client's stated frequency of compliance with medications was measured using items 1-3. Item 4 b was used to measure dietary compliance. Medication

compliance was measured as a possible confounding variable to the relationship of dietary compliance and blood pressure improvement.

A numerical score was assigned to each of the responses so that a high score was indicative of a high degree of compliance. For this study, only those clients who were prescribed sodium restricted and/or weight loss diets were included in the analyses items 4 and 4a).

Blood Pressure Improvement

Blood pressure control is defined as a systolic pressure equal to or less than 140 mm Hg and a diastolic pressure less than or equal to 90 mm Hg. For this study, blood pressure improvement was considered a statistically significant decrease in systolic and/or diastolic blood pressure at the .05 level of significance.

Extraneous Variables

Extraneous variables are defined as independent variables that may influence the results of the study (Polit and Hungler, 1983). The sociodemographic data of age, sex, race, marital status, income, educational background. and duration of hypertension were examined using the items on the Sociodemographic instrument (Appendix C). These sociodemographics were utilized as extraneous variables and examined for possible correlations to the major study variables.

As mentioned, medication compliance was examined as a possible confounding variable effecting change in blood pressure. Weight was also examined for possible use as an additional measure of compliance with weight loss diets.

Development of Instruments

The instruments in this study were drawn from those designed for Patient Contribution to Care: Link to Process and Outcome (Given and

Given, 1982). The original questions used to measure Beliefs about High Blood Pressure evolved from two sources. A literature review of hypertension was conducted to determine clients' perceptions concerning disease and treatment, including perceptions of benefits to therapy. Beliefs concerning high blood pressure were also developed by conducting in-depth interviews over a six month period involving a convenience sample of 30 hypertensives. During the interview, clients were asked to relate how they perceived treatment helped to control hypertension. From these two sources, and the statements concerning benefits of treatment, benefits and barriers to diet were developed. A five-point Likert scale ranging from "strongly agree" to "strongly disagree" was used to record responses (Appendix C-Beliefs). The commitment scale (Appendix C), discussed previously, was the final scale developed to measure perceived benefits of diet. Data relevant to the subscales were also analyzed in this study using the sample prescribed a sodium restricted and/or weight loss diet.

The original scale to measure knowledge, Understanding High Blood Pressure, was developed by collecting questions and statements that could be used to measure dimensions of client knowledge. The multiple choice questions evolved from an extensive review of hypertensive literature and client education about treatment, including diet. Responses were classified as either correct or incorrect. The question from the original 27 item instrument that specifically addressed diet were the items used to measure knowledge about diet for this study (Appendix C-Understanding High Blood Pressure-Diet).

The original instruments to measure knowledge and beliefs concerning hypertension from which the instruments in this study were

derived, were administered to two samples of hypertensive clients (n=154 and n=97 respectively) and responses were factor analyzed to provide evidence of content and construct validity. The reliability of the instruments was also established based on data analysis from the two samples. The criteria used for inclusion into the instrument analysis samples were the same as the original research sample from which the sample in this study was obtained. The samples for instrument analysis were drawn from populations of hypertensive clients receiving treatment at ambulatory care centers serving as training sites for residents in family practice.

Scoring

The knowledge instrument (Understanding High Blood Pressure-Diet, Appendix C) was scored by classifying responses as correct or incorrect based on a review of the literature (Given and Given, 1982). A knowledge score for diet was obtained for each hypertensive client prescribed a sodium restricted and/or weight loss diet and who completed the study from the experimental group at intake and termination.

The Commitment to Diet instrument (Appendix C) was scored by assigning a point value ranging from one to five for each of the five possible responses from strongly agree to strongly disagree. Scoring was reversed for items worded negatively. For example, a score of five was assigned to the response, "strongly agree" to the statement, "Following my diet does not interfere with my normal daily activities." A response of "strongly disagree" to the statement, "It has been difficult following the diet prescribed for me," was also assigned a score of five. A high score on the Commitment instrument

was indicative of perceiving benefits of diet. The scores were calculated for the experimental subjects who completed the instruments at intake and terminated and who were prescribed a sodium restricted and/or weight loss diet.

Stated compliance was scored from five (all of the time) to zero (none of the time) to obtain a compliance score for each participant at intake and termination using the questions on the Hypertensive Client Interview (Appendix C). Medication and diet compliance were scored for the participants of the experimental group prescribed a sodium restricted and/or weight loss diet.

Validity

Validity refers to the degree to which an instrument measures what it is intended and presumed to measure. Content validity is concerned with adequate sampling of content. There are no objective methods to confirm the adequacy of content coverage of an instrument. One way to establish validity is by relying on experts to determine if items are representative of the trait to be measured (Fink and Kosecoff, 1984); Polit and Hungler, 1983; Rossi and Freeman, 1982). Content validity is concerned with establishing the degree to which the items comprising a scale represent the characteristics to be measured (Fink and Kosecoff, 1984). The content validity of an instrument is based on judgment.

The scales that were used in this study were derived from scales developed from literature review, interview of hypertensive clients, factor analysis using two samples of hypertensive clients, and the expert knowledge and judgment of the principal investigators and research colleagues. Face validity, determined by inspecting items to

see if the instrument contains important items to measure the variables (Dempsey and Dempsey, 1986) was based on the expert opinion of the principal investigators and colleagues. Factor analysis data obtained by the original investigators was used to suggest ways to revise the instruments and so to improve the measurement of the construct. Factor analysis was also used to determine the internal structure for the sets of variables and so contributed to instrument validity.

Reliability

Measures of reliability, or internal consistency were conducted for the original instruments used to derive those in this study. Internal consistency refers to the extent to which all of the instrument items, or subscales, measure the same attribute (Polit and Hungler, 1983). A measure is reliable to the extent that application of the instrument produces the same results repeatedly (Rossi and Freeman, 1982). The less the scores on a given instrument are influenced by error, the more reliable the instrument. One of the most useful indices of reliability is Cronbach's alpha. The normal range of value of values of the alpha coefficient is from 0.00 to 1.00. The higher the coefficient, the higher the degree of internal consistency (Polit and Hungler, 1983).

The Cronbach's alpha for the Commitment to Diet instrument (Appendix C) was .69 based on data analysis from the sample used to develop the original instruments. The items represented those with the strongest correlation coefficients from the subscales of Benefits of Diet and Barriers to Following Diet (Appendix C). A KR 20 (used for dichotomous data) on the entire 27 item instrument used to measure

knowledge was .63. The reliability scores computed by Cronbach's alpha and KR 20 measure the homogeniety of items thought to measure the same construct. The closer the correlation, the greater the internal consistency. The reliability coefficients for the scales used in this study were computed and are reported in Chapter V.

Cronbach's alpha for self-reports of compliance is reported in the literature as .92 (Morisky et al., 1980, 1986). The Hypertensive Client Interview (Appendix C) is an instrument that measures self-reported compliance. The principal investigators used factor analysis to investigate the internal consistency of the compliance measure by using the responses to items 1-3 on the Hypertensive Client Interview and reported that the resulting scale had an acceptable level of internal consistency (Given and Given, 1982, p. 39). Reliability coefficients were not calculated on the compliance measures in this study.

The reliability of the blood pressure measurements in the original study was determined using test-retest. The results were .79 for systolic and .78 for diastolic indicating a high level of stability of the measure (Given and Given, 1982).

Data Collection Procedures

Data were collected from three sources: 1) interviews with clients; 2) the structured self-administered questionnaires, and 3) the client's medical records. Included in this section is a description of the training and supervision of the interviewers and the procedures for data collection.

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

interviewers. The lay interviewers were recruited by personnel at the centers and were subsequently interviewed by the research staff before being hired. The research interviewers received two days of instruction which included an overview of the research, ethics of interviewing, and the responsibilities and techniques of interviewing. Role-playing was also utilized to promote skill acquisition.

After interviewing skills were mastered, each interviewer was given a list of clients to contact from the 256 hypertensives identified as eligible participants for the study from each of the four sites. During the telephone contact, the study was again explained. If the client agreed to participate, an appointment was made at the site where the client usually received care with the interviewer. The interviewer met with the subject at the site and explained the nature and the purpose of the study. The interviewers were responsible for obtaining the written consent for participation or for recording the reason a client chose not to participate. Progress was monitored 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.

After obtaining the client's written consent (Appendix B), five self-administered questionnaires were given to the participant. Portions of three of these instruments were used for this thesis: Beliefs about High Blood Pressure; Understanding High Blood Pressure (Diet); and Sociodemographic data (Appendix C). The interviewers periodically checked the participants progress and allowed 40 to 70 minutes for completion of the questionnaires. Upon completion of the

instruments, the interviewer reviewed each for omissions and then administered the Hypertensive Client Interview (a portion of which was used in this study-Appendix C) and another questionnaire to explore client symptomatology. The instruments were returned to the project personnel for coding. The instruments were pre-coded with the date of completion, site, and a participant code number.

Following the intervention phase of the project, all subjects were asked to complete the same five self-administered instruments and were again interviewed. The interviews of the experimental group took place upon completion of the nursing intervention which was generally slightly longer than six months from intake into the study.

Medical record audits were conducted on four occasions: 1) at screening to determine eligibility for inclusion into the study; 2) at entry into the study; 3) at the end of the intervention; and 4) at three months following the end of the intervention. Auditors were graduate students in the Family Clinical Nurse Specialist program at Michigan State University. The chart auditors met weekly with research associates who monitored progress, performed spot checks of completed audits, and clarified any concerns or misunderstandings. To assure that the audits were conducted accurately, a detailed manual of instruction was prepared and used by the staff prior to the start of each set of audits. The principal investigators and research associates randomly checked audit forms during each set. Data from the audits used in this study were the blood pressures and weights recorded at intake and termination.

Human Subjects Protection

The rights of the respondents were protected through adherence to standard criteria set forth by the Michigan State University Committee on Research Involving Human Subjects. All participants were sent a letter from the agency where they normally received care before being contacted by an interviewer (Appendix A). The letter described the study and its benefits, assured participants of anonymity and confidentiality, and requested participation in the study. The letter was signed by either the medical director of the health-care center where the client received care or by the client's private physician.

An interviewer initiated telephone contact with potential subjects who returned a postcard indicating a willingness to participate in the study. Clients who requested more information were also contacted as well as those who did not return the postcard. During the telephone conversation, the study was again described and questions answered. If the client indicated a willingness to participate, an appointment time was arranged to meet with the interviewer at the site.

At the initial contact with the potential subject, the interviewer again described the study and told each potential participant that they had the right to refuse to participate without fear of jeopardizing the health care they were receiving. The client was also told that they could withdraw at any time during the study. The client was then asked to sign a consent form. The consent form provided an explanation of the research, including the purpose of the study, the use of the results, and assurances of anonymity and confidentiality (Appendix B). Confidentiality and anonymity were

assured through the use of code numbers on the instruments used for data collection and analysis. Consent forms and questionnaires were separated immediately upon return to Michigan State University.

Statistical Analysis of the Data

Data from those clients assigned to the experimental group who were prescribed a low sodium and/or weight loss diet were examined for this study. Descriptive statistics were used to describe the sociodemographic characteristics of the sample. Tables summarizing distribution and percentages of subjects by demographic variables are presented in Chapter V. Descriptive statistical analysis allows for presentation of quantitative facts concerning the sample (Dempsey and Dempsey, 1986; Polit and Hungler, 1983).

Reliability coefficients were calculated for the instruments used to measure knowledge about diet, perceived benefits of diet (commitment to diet scale), and the subscales on the instrument Beliefs About High Blood Pressure (Appendix C). The reliability data are reported in Chapter V.

Data from those clients assigned to the experimental group and prescribed a low sodium and/or weight loss diet were also analyzed to examine the effects of the nursing intervention. A dependent t test was used to determine if there were statistically significant differences in mean scores for knowledge about diet, commitment to diet, and perceived efficacy of treatment from intake to termination. A dependent t was also computed for blood pressure, weight, and compliance both with diet and medications. Findings considered statistically significant were those at the .05 level. The dependent or correlated t-test is the basic parametric procedure for testing

differences in group means between pre and post intervention measures. Results can be used to provide information as to whether the differences in score sizes or outcome measures occurred by chance alone (Polit and Hungler, 1983).

Each of the research questions were answered by computing correlation coefficients using Pearson Product Moment. This procedure was also used to describe the relationships between the study variables and the sociodemographic and extraneous variables. The Pearson r is calculated to express the magnitude and direction of a relationship between variables. The value ranges are from -1.00 to 1.00. All correlations between -1.00 and 0.00 are indicative of negative relationships implying that as the score on one measure increases, the score on the other measure decreases. Coefficients of 0.00 to 1.00 indicate positive relationship between variables (Polit and Hungler, 1983).

For this study, coefficients of 0.00-0.2 were considered as indicative of no relationship between variables. Coefficients of 0.2-0.35 were considered representative of low relationships. A coefficient of 0.35-0.85 was considered descriptive of a moderate relationship and a correlation of greater than 0.85 as indicative of a high correlation between variables (Borg and Gall, 1979). The level of significance to draw conclusions about any relationships found in this study was .05.

Summary

In this chapter the research methodology was described and discussed. The specific topics addressed were the research question, the population and sample, and operational definition of the

variables, instrument development, data collection procedures, human subjects protestion, and procedures for data analysis. An analysis of the data and findings relevant to the research questions are presented in Chapter V. A summary of the findings, implications, and recommendations are presented in Chapter VI.

CHAPTER V

Data Presentation and Analysis

Overview

A description and analysis of the sample is discussed in this chapter. Reliability measures of the instruments and mean scores before and following the intervention are presented. Data relevant to each of the research questions are presented to examine the relationship between the major study variables of knowledge about diet and perceived benefits of diet to compliance with diet and to each other. Data concerning the relationship of dietary compliance to blood pressure are also included. Additional relevant findings from data analysis are also discussed.

Sample Characteristics

The sample for which data were available and analyzed for this study consisted of 67 persons who were diagnosed and medically treated for hypertension and who were assigned to an experimental nursing intervention. The subjects in the sample analyzed were prescribed a low sodium and/or calorie restricted diet as part of the medical treatment plan for hypertension. Subjects in the study were literate and showed no evidence of stroke, cancer, end-stage renal disease, blindness, psychiatric problems, or pregnancy and lactation. Subjects who participated in the intervention had at least two elevated blood pressures of 140/95 mm Hg or higher within six months prior to intake into the study.

Among the 99 subjects who were assigned to the experimental group and who completed the intake interviews, 67 had prescribed low sodium and/or calorie restricted diet. Among these, 32 were told to follow a low sodium diet, 11 a reducing diet, and 24 a combination of a low sodium and low calorie diet.

In sum, the sample analyzed in this study consisted of 67 literate subjects diagnosed as uncomplicated hypertension. Part of the therapeutic regimen for these subjects was a low sodium and/or calorie restricted diet.

Sociodemographic Variables

The sociodemographic variables addressed in this study include: sex, age, race, marital status, income, education, and duration of hypertension. Distributions concerning the sociodemographic variables of sex, age, and race are presented in Table 5.1.

The sample analyzed was distributed as follows:

Sex: Among the 67 participants, 43% were male (n=29) and 57% were female (n=38).

Age: The age of the participants ranged from 24-65. The mean age was 47 with a standard deviation of 10.4 years.

Race: The majority of the 67 participants were white (88%, n=59). Seven were black (11%) and one described race as other.

The sociodemographic variables concerning marital status, income, education, and duration of hypertension are presented in Table 5.2. Distribution and percentages concerning the variables are included.

Table 5.1

Distribution of Subjects by Sociodemographic Variables of Sex, Age, and Race.

Variable	Subject	Percentages
Sex		
Male	29	43
Female	38	57
	n=67	100%
Age		
24-35	9	13
36-45	17	26
46-55	26	39
56-65	15	22
	n=67	100%
Race		
White	59	88
Black	7	11
Other	1	1
	N=67	100%

Table 5.2

Distribution of Subjects by Sociodemographic Variables of Marital Status, Income, Education, and Duration of Hypertension.

Variable	Subject	Percentages
Marital Status		
Married	48	72
Single	6	9
Separated	1	1
Divorced	7	11
Widowed	5	7
	n=67	100%
Income		
Less than $5,000	2	3
$5,000-10,000	9	14
$11,000-17,999	11	16
$18,000-24,999	15	23
$25,000 or over	29	44
	n=67	100%
Education		
Less than 7 grades	2	3
9-11 grades	10	15
Graduated High School	25	38
Technical Education	1	1
Some College	16	24
Graduated College	7	10
Post College	6	9
	n=67	100%
Duration of Hypertension		
Less than 1 Year	8	12
1-5 Years	32	48
6-10 Years	19	28
11-15 Years	1	1
More than 15 Years	6	11
No Data	1	1
	n=67	100%

Marital Status: Among the 67 subjects, the majority were married (72%, n=48). Six reported being single (9%), one was separated, seven were divorced (11%), and five reported widowhood (7%).

Income: Income data were available for 66 of the 67 subjects in the study. Two (3% had income less than $5,000 and 19 (44%) had incomes greater than $25,000. The majority of subjects had incomes greater than $18,000 (n=44).

Education: Among the 67 subjects, 18% (n=12) had less than a high school education. High school was completed by 38% (n=32) and 44% (n=34) had education beyond high school.

Duration of Hypertension: The average duration of hypertension among the 66 participants who responded was between one and five years. The mean duration was 3.4 years with a standard deviation of 1.6 years.

In sum, the typical participant was white, either male or female, 47 years old, and married. The typical subject had an income of at least $18,000, a high school education and beyond, and a diagnosis of hypertension for at least three years.

Extraneous Variables

The extraneous variables analyzed include medication compliance and weight. Medication compliance was examined as a confounding variable with regard to blood pressure control. Weight was examined as a possible measure of compliance with diet.

Medication Compliance

All 67 subjects were taking at least one medication for hypertension. The majority (62%, n=42) were taking at least two medications. The mean compliance score at intake to the intervention

was 4.74 (range of 1-5) with a standard deviation of .60. The mean compliance score following the intervention was available for 60 subjects and was 4.44 with a standard deviation of 1.6. A two-tailed correlated t-test indicated there was no significant change in medication compliance from intake to termination. The scores indicate compliance with medications was high both at intake and termination.

Weight

Weights were available on only 54 of the subjects at intake and 44 at termination. Since the two-tailed correlated t indicated there was no significant change in weight from intake to termination, weight data was not used as a measure of compliance among these subjects. Further analysis of data concerning weight change among the participants was beyond the scope of this study.

Research Question

The research questions to be answered are:

Question 1. Is there a relationship between client knowledge about diet and perception of benefits of diet to stated compliance with diet before following an experimental nursing intervention? Specifically:

Question 1a. Is there a relationship between client knowledge scores about diet and diet compliance scores before and following an experimental nursing intervention?

Question 1b. Is there a relationship between client perceived benefits of diet scores and diet compliance scores before and following an experimental nursing intervention?

Question 1c. Is there a relationship between client knowledge scores about diet and perceived benefits of diet scores before and following an experimental nursing intervention?

Question 2. Is there a relationship between client compliance scores concerning diet and blood pressure before and following an experimental nursing intervention?

Reliability coefficients for each of the instruments used to answer these questions were obtained. The next section describes the procedures and results of the establishment of reliability.

Reliability of Instruments

The reliability coefficients for each of the instruments used in data analysis are presented in Table 5.3. The information in this section is a description of the procedures used to determine reliability of the instruments as well as how each instrument was scored.

Understanding High Blood Pressure (Diet)

Understanding High Blood Pressure (Diet) was the instrument used to measure the variable knowledge about diet. The statistical procedure to determine reliability of the instrument was the Kuder-Richardson 20 (KR 20). The level of cognitive knowledge about diet was obtained by assigning a numerical value of one to each of the correct responses so that the higher the obtained value, the greater the degree of knowledge about diet.

The reliability coefficient for Understanding High Blood Pressure (Diet) was .45 The decrease in reliability from the original instrument can be explained, in part, by the fact that only seven items were used to measure knowledge about diet. The original

instrument measured knowledge about hypertension in general and consisted of 27 items. The reliability coefficient of .63 for the original instrument was obtained using different and larger sample sizes (n=154, n=97). The number of items influences reliability. Reliability is not a property of the instrument itself but of an instrument administered to a specific sample under specific conditions (Polit & Hungler, 1983).

The .45 reliability coefficient suggests that the subparts of the instrument used to measure knowledge were not homogeneous or equivalent in measuring the attribute: knowledge about diet. The low reliability indicates the tool is not stable, consistent, or dependable in measuring knowledge about diet. The degree of error in measuring knowledge, due to the low reliability, calls into question the accuracy of findings in measuring knowledge about diet. If an instrument is not a reliable measure of a concept it cannot accurately measure that concept. Changes suggested in the instrument to improve reliability are discussed in Chapter VI.

Table 5.3

Mean Scores and Reliability Coefficients for the Scales Understanding High Blood Pressure (Diet) and Commitment to Diet and Subscales of Beliefs About High Blood Pressure.

Scale	Participants	Mean	S.D	Reliability
Understanding High Blood Pressure (Diet)	n=57	4.6	1.09	.45
Commitment to Diet	n=53	2.4	.56	.62
Beliefs About High Blood Pressure				
Efficacy of Treatment	n=63	4.1	.46	.75
Benefits of Diet	n-67	2.3	.57	.64
Barriers to Following Diet	n=58	2.8	.31	-.56

Note: S.D. = Standard Deviation

Perceived Benefits

The Cronbach's alpha was the statistical procedure used to determine the reliability of instrument used to measure perceived benefits of diet: Commitment to Diet. Reliability coefficients were also calculated for each of the subscales on the Beliefs About High Blood Pressure instruments. The subscales include: Efficacy of Treatment, Benefits of Diet, and Barriers to Following Diet.

The alpha coefficient for Commitment to Diet was .62 indicating a low to satisfactory reliability for making group level comparisons concerning perceived benefits of diet. The reliability coefficient for the subscale of Efficacy of Treatment was .75 and was developed to measure belief in the benefits of treatment for hypertension in general. The subscale Benefits of Diet had an alpha coefficient of .64. These two scales have acceptable reliability coefficients for making group level comparisons. The subscale Barriers to Following Diet had a negative reliability coefficient so will not be utilized for analysis. It will be recalled that the instrument, Commitment to Diet, consists of the items with the highest alpha coefficients for the subscales to measure benefits and barriers of diet.

Mean scores for each of these instruments were obtained by assigning a value of 1-5 for each response so that a high score reflects higher commitment to diet, higher perceived efficacy of treatment, higher perceived benefits of diet, and low perceived barriers to following the diet respectively. The mean scores are reported in Table 5.3 along with the reliability coefficients.

Reliability studies for the compliance measure and blood pressure data used this study were beyond the scope of this study. The

original investigators did reliability studies on both these measures as discussed in Chapter IV.

In sum, the instruments used to measure the variables of knowledge about diet and perceived benefits of diet have varying degrees of reliability. The instrument to measure knowledge has an alpha coefficient that brings into question the accuracy of the findings relevant to measuring the knowledge variable. The instrument used to measure benefits of diet has an acceptable coefficient for making group level comparisons as do the subscales that measure belief in the benefits of treatment in general and beliefs in benefits of diet. The subscale, barriers to following diet, had an unacceptable reliability coefficient for use in analysis of data for this study.

Data Presentation

The major research questions and subquestions are addressed in this section after a presentation of data concerning scores before and following the experimental nursing intervention. A probability of .05 is the level considered as statistically significant for all procedures used in data analysis. The Pearson Product Moment coefficient of correlation (r) was the statistical procedure used to answer each of the research questions. The degree and direction of significant relationships among the variables are also discussed.

Table 5.4

T-Test for the Significance of Mean Differences in Scores for the Instruments Understanding High Blood Pressure (Diet), Commitment to Diet and the Subscale Efficacy of Treatment.

Instrument	Subjects	Mean Scores	Mean Difference	T	Probability
Understanding High Blood Pressure (Diet)	n=67	4.4 4.1	.28	1.22	.23
Commitment to Diet	n=50	2.4 2.3	.12	1.64	.11
Beliefs About High Blood Pressure Efficacy of Treatment	n=56	4.2 4.4	-.28	-5.02	<.001

Mean scores and standard deviations for each of the instruments at intake into the study are presented in Table 5.3. The mean scores at termination were also calculated and a two-tailed correlated t was performed to examine the significance of any changes that resulted. The results of this analysis are presented in Table 5.4. The only significant finding was an increase in perceived efficacy of treatment which increased from a mean pretreatment score of 4.2 to a termination score of 4.4 significant at p= .001.

A correlated t-test was also computed to examine the significance of change in compliance with diet. Data from this analysis are in table 5.5. The mean compliance with diet score at intake was 2.7. At termination, the mean score was 2.5. Compliance with diet significantly decreased from intake to termination (t=2.44, p=.02).

Also presented in Table 5.5 are the results of the t-test for significance of change in systolic and diastolic blood pressure. The mean systolic pressure before treatment was 147 mm Hg. At termination the mean systolic blood pressure was 136 mm Hg. There was a significant change in systolic blood pressure from intake to termination (t=5.62, p= .001). At intake, the mean diastolic pressure was 93 mm Hg and at termination, the mean diastolic pressure was 87 mm Hg. There was also a significant decrease in diastolic pressure from intake to termination (t=5.25, p .001).

Table 5.5

T-Test for the Significance of Mean Differences in Diet Compliance and Blood Pressure.

Variable	Subjects	Mean Scores	Mean Difference	T	Probability
Compliance With Diet	n=53	2.7 2.5	.43	2.44	.02
Systolic Blood Pressure	n=45	147 136	10.91	5.62	.001
Diastolic Blood Pressure	n=45	93 87	5.4	5.25	.001

In sum, among the instruments used to measure the variables of knowledge about diet and perceived benefits of diet and efficacy of treatment in general, the only significant difference in mean scores was in beliefs concerning the efficacy of treatment which increased from intake to termination, but both systolic and diastolic pressure significantly improved. These findings are discussed further in Chapter VI.

The research questions and other findings are addressed in the remainder of this section.

Question 1. Is there a relationship between client knowledge about diet and perception of benefits of diet to stated compliance with diet before and following a nursing intervention?

Question 1a. Is there a relationship between client knowledge scores about diet and diet compliance before and following a nursing intervention?

There was no relationship between the variables measuring knowledge about diet (Understanding High Blood Pressure-Diet) and stated compliance with diet at intake ($r=.06$, $p=.32$). There was also no relationship between the two variables at termination ($r=.16$, $p=.12$). It must be kept in mind that the accuracy of this finding is questionable considering the reliability of the knowledge instrument.

Question 1b. Is there a relationship between client perceived benefits of diet scores and compliance with diet before and following a nursing intervention?

The correlation between benefits of diet as measured by the commitment scale and compliance with diet was moderate, positive, and highly significant at intake ($r.51$, $p=.001$). Following the

intervention, the relationship between benefits of diet and diet compliance remained moderate, positive, and significant (r=.38, p=.005).

There was no relationship between perceived efficacy of treatment in general and compliance with diet (r=-.16, p=.11) at intake. Following the nursing intervention, the relationship between these two variables did not change (r=-.11, p=.20).

Question 1c. Is there a relationship between knowledge scores about diet and perceived benefits scores before and following a nursing intervention?

There was no correlation between the scores measuring knowledge about diet and benefits of diet at intake (r=-.05), p=.35). The lack of relationship between these two variables persisted at termination (r=-.10, p=.23). There was, however, a low, but significant and positive relationship between knowledge about diet and perceived efficacy of treatment in general at intake (r=.35, p=.002). This relationship did not persist at termination (r=.13, p=.16). Again, it must be pointed out that the accuracy of these findings are questionable.

A summary of the findings at intake are presented in Table 5.6. The termination correlations are presented in Table 5.7.

The correlations at intake (Table 5.6) also indicate that there was a low, negative and significant relationship between perceived efficacy of treatment and benefots of diet at intake (r=-.27, p=.02). At termination, the relationship between these two variables remained the same (r=-.30, p=.01).

Table 5.6

The Correlation Between Knowledge Scores, Perceived Benefits of Diet Scores (Commitment to Diet), Efficacy of Treatment Scores, and Compliance with Diet Scores at Intake.

Variable	Knowledge about Diet	Benefits of Diet (Commitment to Diet)	Efficacy of Treatment	Diet Compliance
Knowledge about Diet	1.00			
Benefits of Diet (Commitment to Diet)	r=-.05 p=.35	1.00		
Efficacy of Treatment	r=.35 p=.002	r=-.27 p=.02	1.00	
Diet Compliance	r=.06 p=.32	r=.51 p=.001	r=-.16 p=.11	1.00

Based on the analyses of data to answer research question 1 using 1a-1c, there is no relationship between knowledge about diet and compliance with diet at either intake or termination of the experimental nursing intervention. There is a moderate, positive, and highly significant relationship between perceived benefits of diet and compliance with diet at both intake and termination of the nursing intervention. However, there was no relationship between beliefs in the benefits of treatment for hypertension in general and compliance with diet. There was no relationship between knowledge about diet and perceived benefits of diet at either intake or termination, but there was a low, positive, and significant relationship between knowledge about diet and efficacy of treatment in general at intake into the nursing intervention. The relationship, however, did not persist at termination. Any relationship involving knowledge should be cautiously interpreted due to the low reliability of the knowledge instrument.

Correlations were also computed for change in diet compliance from intake to termination and knowledge about diet before and following the nursing intervention, perceived benefits of diet pre and post treatment, as well as beliefs in the benefits of treatment for hypertension. The only significant relationship was a highly significant, moderate, and negative relationship between perceived benefits of diet before treatment and change in diet compliance ($r=-.37$, $p=.006$). It will be recalled, however, that there was a significant decrease in dietary compliance from intake to termination of the intervention ($t=2.44$, $p=.02$).

Table 5.7

The Correlation Between Knowledge Scores, Perceived Benefits of Diet Scores (Commitment to Diet), Efficacy of Treatment Scores, and Compliance with Diet Scores at Termination.

Variable	Knowledge about Diet	Benefits of Diet (Commitment to Diet)	Efficacy of Treatment	Diet Compliance
Knowledge about Diet	1.00			
Benefits of Diet (Commitment to Diet)	r=-.10 p=.23	1.00		
Efficacy of Treatment	r=.13 p=.16	r=-.30 p=.01	1.00	
Diet Compliance	r=.16 p=.12	r=.38 p=.005	r=-.11 p=.20	1.00

Question 2. Is there a relationship between compliance with diet and blood pressure before and following a nursing intervention?

There was no relationship between compliance with diet and either systolic or diastolic blood pressure either before or following the experimental nursing intervention. There was also no relationship between change in compliance with diet from intake to termination and change in diastolic or systolic blood pressure ($r=-.17$, $p=.12$ for systolic pressure change and $r=.03$, $p=.43$ for diastolic pressure change). The possible explanations for these findings are discussed in Chapter VI.

Other Findings

Since both diastolic and systolic blood pressure significantly decreased during the intervention ($t=5.25$, $p<.001$ for diastolic and $t=5.62$, $p<.001$) for systolic blood pressure), correlations were computed to determine if any of the major study variables other than diet compliance contributed to the significant decrease in blood pressure. There were no significant findings. There was, however, significant and negative correlation between medication compliance and systolic blood pressure at intake ($r=-.26$, $p=.05$) and at termination ($r=-.38$, $p=.006$). The relationship between diastolic blood pressure and medication compliance at termination approached significance and was also negative ($r=-.22$, $p=.07$). There was also a significant and negative correlation between compliance with medication at intake and termination with change in both systolic and diastolic blood pressure (Table 5.8). Based on this finding, medication compliance contributed to the blood pressure improvement among the participants in this study. This finding is further discussed in Chapter VI.

Compliance with diet and weight were also correlated to examine the relationship between these two variables. There were no significant findings at either intake or termination. There was a positive and significant correlation between change in compliance with diet and change in weight (r=.31, p=.03). The only significant correlation between the independent variables in this study and weight was a positive relationship between benefits of diet at termination and weight at intake (r=.25, p=.05). The correlation between perceived benefits of diet and weight at intake approached significance (r=.22, p=.07) as did the correlation between perceived benefits of diet and weight at termination (r=.24, p=.08).

Compliance with diet was correlated with compliance with medications at both intake and termination. The significant finding was a negative and highly significant relationship between compliance with medication and compliance with diet at intake (r=-.37, p=.001).

The Pearson r was also calculated to examine the relationship between the sociodemographic variables of sex, age, race, marital status, income, education, and duration of hypertension to each of the major study variables including: knowledge about diet, perceived benefits of diet, perceived efficacy of treatment in general, and compliance with diet. The correlations between the sociodemographic variables and changes in the dependent variables of diet compliance, systolic and diastolic blood pressure, and weight were also examined. The significant findings are in Table 5.9.

Sex was found to have a low but significant relationship to knowledge about diet intake (r=.21, p=.05) indicating that female

Table 5.8

Correlations Between Changes in Systolic and Diastolic Blood Pressure and Weight and Compliance with Diet and Medications and Change in Diet Compliance.

Variable	Change in Systolic Blood Pressure	Change in Diastolic Blood Pressure	Change in Weight
Compliance with Diet (Intake)	N.S.	N.S.	N.S
Compliance with Diet (Termination)	N.S.	N.S.	N.S.
Compliance with Medication (Intake)	r=-.39 p=.004	r=-.42 p=.002	N.S.
Compliance with Medication (Termination)	r=-.27 p=.04	r=-.50 p=.001	N.S. N.S.
Change in Diet Compliance	N.S.	N.S.	r=.31 p=.03

Table 5.9

The Relationship of the Sociodemographic Variables to Knowledge about, Perceived Benefits of, and Compliance with Diet.

Variable	Sex	Age	Duration of Hypertension
Knowledge about Diet (Intake)	r=.21 p=.05	N.S.	N.S.
Perceived Benefits of Diet (Intake)	N.S.	r=-.27 p=.03	N.S.
Perceived Benefits of Diet (Termination)	N.S.	r=-.28 p=.03	r=.26 p=.03
Compliance with Diet (Intake)	r=.22 p=.04	r=-.23 p=.05	N.S.
Compliance with Diet (Termination)	r=.25 p=.04	r=-.35 p=.005	N.S.

participants had more knowledge about diet at intake into the study. Female participants were also slightly more compliant with diet at intake (r=.22, p=.04) and termination (r=.25, p=.04) than male participants.

Age was found to be significantly and negatively correlated to perceived benefits of diet at intake (r=-.27, p=.03) and termination (r=-.28, p=.03). There was also a negative and significant relationship between age and compliance with diet both at intake (r=-.23, p=.05) and termination (r=-.35, p=.005). The correlation between beliefs in the benefits of treatment for hypertension and age were positively and significantly correlated (r=.24, p=.03). Younger participants were, therefore, more likely to perceive benefit of diet and to comply with diet, but older participants were more likely to perceive benefits to treatment in general.

Duration of hypertension and perceived benefits of diet were also found to be slightly, but significantly related (r=.26, p=.03). The relationship suggests that the longer the duration of diagnosed hypertension, the more benefits of diet perceived.

The only significant findings when the sociodemographic variables were correlated with changes in diet compliance, blood pressure, and weight were a positive but low relationship between education and change in compliance (r=.22, p=.05) and a negative correlation between education and change in systolic blood pressure (r=-.25, p=.04). These relationships suggest that more education was associated with change in diet compliance and less education with change in systolic blood pressure.

Summary

In sum, there is evidence from the data that there is no relationship between client knowledge about diet and compliance with diet either at intake or termination of the nursing intervention. There is evidence that there is a positive and significant relationship between perceived benefits of diet and compliance with diet both at intake and termination of the study. There is no relationship between the two variables of knowledge about diet and belief in the benefits of diet at either intake or termination. Although belief in the benefits of treatment in general had a low and significant relationship to knowledge about diet at intake, the relationship did not persist.

There was no relationship between compliance with diet and either systolic or diastolic blood pressure at intake or termination. There was also no relationship between change in blood pressure and compliance with diet either at intake or termination or to change in compliance. There was, however, a significant relationship between medication compliance and blood pressure at intake and termination and the change in blood pressure.

The only significant changes from intake to termination among the major study variables that were positive were in systolic and diastolic blood pressure and belief in the benefits of treatment in general. There was a negative and significant change in compliance with diet.

The only sociodemographic variables significantly related to the major study variables were sex, age, and duration of hypertension. The only significant correlation between the major study variables and

the changes in the dependent variables were between education and change in diet compliance and education and change in systolic blood pressure.

A discussion of the findings are presented in Chapter VI. also in Chapter VI are recommendations for nursing practice, education, and future research based on the results of this study.

CHAPTER VI

Summary and Conclusions

Overview

A summary and interpretation of the research findings will be presented in this chapter. The sociodemographic characteristics of the study sample will be discussed and compared to sample characteristics of other research. The findings related to the research questions will be presented and will be compared to findings from other studies. Lastly, the implications of the findings for nursing practice, education, and future research will be addressed.

Sociodemographic Characteristics of the Sample

The sociodemographic variables among participants in this study will be discussed and compared to those of subjects in related research. The sociodemographic characteristics examined in this study include: sex, age, race, marital status, income, education, and duration of hypertension.

Sex. Among the sample in this study there were 29 males (43%) and 38 females (57%). According to the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (JNC, 1985), the prevalence of hypertension is high among males. The frequency of hypertension among noninstitutionalized adults is 2.3 million females compared to 3.0 males. This differs from earlier data reported by Cummings et al. (1982) who reported that women were more likely to have hypertension than men.

Considering the prevalence data, the sample would have been more representative of the hypertensive population if the proportions of males and females were similar to the national statistics. The sex distribution in this study, however, is similar to some of the major studies involving hypertension such as the Hypertension Detection and Follow-up Program (1979, 1980, & 1982), and the Farmingham Study (Dawber, 1980; Kannel. 1978). Several of the major clinical trials for hypertension treatment were restricted to males only such as the Veterans Administration Cooperative Group (Borhani, 1981, 1982; Kochar, 1981), the Multiple Risk Factor Intervention Trial (MRFIT, 1977; Grim et al., 1985).

Studies concerning dietary intervention for hypertension to lower blood pressure were either generally restricted to males (Anderson et al., 1984; Gillum et al., 1983; Jeffery et al., 1983; Stamler et al., 1980) or did not report any outcomes significantly related to sex of the participant (Heyden et al., 1984; Reisen et al., 1978; Tuck et al., 1981; Velasquez and Hoffman, 1985). Only two researchers reported significant differences between the sexes related to diet. Holbrook and colleagues (1984) found among a sample of normotensives that females consumed significantly less sodium whereas weight in males was more significantly correlated with blood pressure. The large scale Farmingham Study (Dawber, 1980) had results that weight change in males contributed more to lowering blood pressure than weight change in females.

Among the findings in this study were that females were slightly more knowledgeable about diet and complied better with diet both at intake and termination. Two other researchers found sex correlated

with compliance (Nelson et al., 1980; Widmer, Cadoret, and Troughton, 1983), but both these studies examined medication compliance only. Major reviewers of the compliance literature state that sex is not a significant predictor of compliance with therapeutic regimens (Becker, 1979; Glanz, 1980; Hershey et al., 1980; Kirscht & Rosenstock, 1977; Janz & Becker, 1984).

There does not appear to be any support in the literature that sex is related to more knowledge about diet. This is partly because studies concerning compliance with hypertensive diets are limited and usually involve a specific age or sex (Glanz, 1980, 1986). Cummings et al. (1982) specifically examined sex in relationship to knowledge about diet and found no significant correlations. Considering the role of females in American society, it seems logical that females would be slightly more knowledgeable about diet than males.

Age. The age of the participants in this study ranged from 24 to 65 with a limit for acceptance into the study of 65. The mean age of the sample was 47. Many of the major studies involving hypertensives used samples with similar ranges (The Australian Trial, 1984; Hypertension Detection and Follow-up Program, 1979, 1980, 1982). The sample involved in the Farmingham Study with over 10,000 participants, ranged in age from 30 to 62.

According to the JNC (1985) the largest prevalence rate for hypertension is among those aged 65 to 74 (64.3%0), but 41.3% of hypertensives in the United Stated are aged 45 to 54, making this sample appropriate to study although younger than most hypertensives. Cummings et al. (1982) in a telephone survey found there was a higher prevalence of hypertension among those older than 56.

Among the subjects in this study, younger participants perceived significantly more benefit of diet and complied better with diet both at intake and termination. There is limited support for these relationships in the literature. For compliance in general, Cummings et al. (1980) found that younger hypertensives were less likely to comply with treatment. Haines and Ward (1981) in another survey of hypertensives, found that younger clients were more likely to discontinue medication on their own. Nelson et al. (1980) found no correlation between age and medication compliance.

Based on a review of the studies concerning dietary adherences, Glanz (1980, 1986) states there is no persistent relationship between age and dietary adherence. Kirscht et al. (1977), however, did find less tendency for diet compliance among subjects older than 60, but Cummings et al. (1980) found that older clients tended to comply better with diet.

Race. The sample in this study was predominantly white (88%). There were seven blacks among the participants and one who described race as other. Among the population of the United States, there is a higher proportion of hypertensives who are black. According to the JNC (1985), 38.2% of hypertensives are black, while 28,8% are white. The remaining 29.8% include all other races. The survey done by Cummings et al. (1980) involved primarily black hypertensives. Glanz et al. (1981), in a review of intervention studies to improve compliance among hypertensives, report that most participants are black. The findings from this study, due to the predominance of white participants, should not be generalized to the hypertensive population.

Among participants in this study, there was no relationship between race and the major study variables. None of the studies reviewed concerning perceptions of benefits of diet or knowledge about diet had findings that indicated a significant relationship between race and these two variables. There were also no studies identifying race as a predictor of diet compliance among those reviewed.

Marital Status. The participants in this study were, for the most part, married (72%). The remaining subjects were almost equally distributed among those single, divorced, or widowed. There were no relationships between marital status and either knowledge or perceived benefits concerning diet in this study. There also was no relationship between marital status and dietary compliance.

In studies by Cummings et al. (1982) and Haynes et al. (1982) no relationship was found between marital status and compliance. Research conducted by others, however, has produced results that indicates there is a relationship between support and compliance. Nelson et al. (1980) reports that living alone correlated with noncompliance to treatment among hypertensives. Both Cummings et al. (1980) and Greene et al. (1982) state that social support is related to compliance. Glanz (1980, 1986), in reviews of dietary compliance literature, reports that social support contributes significantly to success in weight reduction programs, but that type of support is usually provided by peers and programs managers. Other authors have found that unhealthy or inadequate support systems contribute to low rates of success in weight loss programs (Jeffery et al., 1984; Popkess-Vawter, 1982; Russ, Ciavarella, & Atkinson, 1984). No similar

findings were found in relationship to compliance with low sodium diets.

Income. Only two participants in this study had incomes less than $5,000. A large percentage of the samples (44%) had incomes greater than $25,000. Most participants in this study earned over $18,000 per year. There was no relationship between income and the major study variables.

Another researcher had similar findings. Nelson et al. (1980) reported that socioeconomic status was not related to compliance with hypertensive regimens. Many of the intervention studies to increase compliance with hypertensive regimens are limited to subjects in low income brackets (Glanz & Scholl, 1981). For example, the studies done by Morisky and colleagues, beginning in 1980, and those done by Webb (1980), and Hershey et al. (1980) involved participants with incomes under $5,000. Generalizations from findings from this and other studies are limited to those with similar income characteristics.

Education. The sample analyzed in this study was well educated. Only 12 of the participants (18%) had less than a high school education. Twenty-five (38%) completed high school and the remainder (44%) had educational preparation beyond high school. The subjects in this study were more highly educated than those found in most of the intervention studies concerning compliance with hypertensive regimens (Glanz & Scholl, 1981).

Education was not discussed as a confounding variable in most of the studies concerning compliance with regimens in general or diet in particular among hypertensives. Even among those studies that specifically used educational interventions there was no indication

that educational level was a predictor of either increased knowledge, perceived benefits, or compliance with regimens. There were no correlations between the major study variables and education in this study. There was, however, a low but significant relationship between the change in diet compliance from intake to termination (which significantly decreased) and education such that increased education was associated with the change. Perhaps those with higher education were less inclined to follow the recommendations concerning diet by providers, although this finding is not consistent with the literature.

Another finding was a significant relationship between change in systolic blood pressure and education so that less education was associated with the significant decrease in systolic blood pressure that occurred from intake to termination of the study. There is also no support for this finding in the literature. Further, education was not associated with compliance with medications among this sample which was the only variable examined in this study that was significantly related to the drop in blood pressure.

Duration of Hypertension. The average duration of hypertension among the participants in this study was 3.4 years. Duration of hypertension was slightly, but significantly, correlated to beliefs in benefits of diet at termination and the relationship was close to significance at intake. A longer duration of illness would suggest more experience with treatment and more established beliefs, but there does not appear to be support in the literature indicating that duration is associated with an increase in perceived benefits of treatment. One could conclude that perhaps more experience would

increase knowledge about diet and so perception of benefits, but duration was not associated with knowledge about diet or compliance with diet. Subjects with a longer duration of hypertension may be told so frequently by providers that the prescribed diet was good for them that they did perceive it as beneficial. As will be discussed later, perceived benefits of the diet prescribed was found to be associated with compliance.

Duration of treatment is a factor reported by some authors as a major contributor to noncompliance (Becker, 1979; Becker & Maiman, 1980; Glanz, 1979, 1980, 1986). In relationship to dietary compliance, the indefinite nature of the treatment is consistently mentioned as a contributor to the high levels of nonadherence (Given et al., 1984; Glanz, 1980, 1986; Tillotson, 1984).

In sum, the sample in this study consisted of generally younger hypertensives, more females, and more whites than the national averages reflect for the diagnosis of hypertension. The income level and educational level was generally higher than most studies. Significant relationships were found between less age and perceived benefits to diet and diet compliance, between being female and having more knowledge about diet at intake and complying better with diet, and between longer duration and more belief in the benefits of diet. There was also a significant relationship between change in diet compliance and higher education and change in systolic blood pressure and less education. There were no other significant relationships between sociodemographic variables and the major study variables.

Major reviewers of the compliance studies, including those using the health belief model, report that there are no significant,

consistent predicators of compliance based on sociodemographic characteristics (Becker, 1979; Glanz, 1980; Janz & Becker, 1984). Many reviewers of the health belief model for application of the model for nursing practice to foster compliance do not even discuss the significance of sociodemographic characteristics (Champion, 1984; Given et al., 1984; Lousteau, 1979; Mikail, 1981). The sociodemographic variables are not modifiable by nursing intervention. It appears that the usefulness of sociodemographic information is limited to perhaps recognizing some client groups who may be at higher risk for noncompliance.

Extraneous Variables

The extraneous variables addressed in this study were weight and medication compliance. Medication compliance was included because a number of studies have results that demonstrate a strong and significant correlation between medication compliance and blood pressure control (The Australian Therapeutic Trial, 1980, 1984; Borhani, 1981, 1982; Greene et al., 1979; Haynes et al., 1982; Hershey et al., 1980; Inui et al., 1976; Morisky et al., 1980; Sackett et al., 1978; Watts, 1981; Widmer et al., 1983). It would, therefore, seem logical to statistically control for medication compliance if a relationship existed between diet compliance and blood pressure improvement. Indeed, among the 67 participants in this study, the only significant relationship to blood pressure at intake and termination and to the significant decrease in blood pressure was medication compliance. Although medication compliance did not significantly change, it was high at intake and remained high at

termination. In fact, the high compliance with medication may be a reason that there was no measurable impact from diet compliance.

Weight was included as an extraneous variable for possible use as an objective measure of dietary compliance. However, weight did not change from intake to termination and was not correlated with blood pressure at intake or termination. However, change in weight among the sample (which was nonsignificantly increased) was correlated to change in diet compliance (which significantly decreased). A possible explanation for this finding is that weight increased because compliance with diet worsened or that weight loss was not sustained.

In sum, the extraneous variable of medication compliance was the only variable in this study that significantly related to the improvement in blood pressure among the 67 participants in this study. Weight was not related to compliance with diet nor blood pressure at any point in the study nor to the change in blood pressure.

Statement of the Research Questions

The research questions will be presented along with a brief review of the findings relevant to each question. A discussion of the findings and comparison to the literature will also be included.

Question 1. Is there a relationship between client knowledge about diet and perception of benefits of diet to stated compliance with diet before and following an experimental nursing intervention? Specifically:

Question 1a. Is there a relationship between knowledge scores about diet and compliance with diet scores before and following an experimental nursing intervention?

No relationship was found between the scores on the instrument to measure knowledge about diet and stated compliance with diet at intake or termination of the nursing intervention. Before a discussion of these findings is presented, it must be mentioned that the instrument used to measure knowledge about diet had a low reliability coefficient which brings into question the accuracy of the results.

The findings concerning the lack of relationship between knowledge and compliance is supported by several researchers. Glanz and Scholl (1981), in a review of 18 studies concerning educational strategies to increase compliance, found that while information increases knowledge, there is rarely an impact on compliance. Becker (1979) and Becker and Maiman (1980) in a review of compliance literature also state that there is rarely a correlation between knowledge and adherence with therapeutic regimens. Further, these authors state that interventions to increase knowledge are only beneficial where a knowledge deficit interferes with the client's ability to comply.

Several researchers who conducted studies involving education interventions report similar findings (Bille, 1977; Glanz et al., 1981; Morisky et al., 1980; Powers and Pohaten, 1982; Sackett et al., 1975; Steckel and Swain, 1977, 1981, 1982; Tanner and Noury, 1981). Other authors, however, do report a positive relationship between knowledge and compliance (Given et al., 1979; Hafeman & Madison, 1980; Inui et al., 1976; Sackett, 1980; Wyka et al., 1980; Zismer et al., 1982).

There are few studies that include data concerning the relationship of knowledge about diet to diet compliance specifically.

Three studies were reviewed; one was among hemodialysis clients (Cummings et al., 1983), one among diabetics (Korhanen et al., 1983), and one among hypertensives (Nugent et al., 1984). No significant relationship was found between knowledge about diet and compliance with diet in any of the studies.

Perhaps findings concerning the relationship of knowledge to compliance are inconsistent because 1) interventions to provide knowledge vary significantly among researchers and 2) measures of compliance are inconsistent. For instance, Steckel and Swain (1977, 1981, 1982) used only the distribution of an informational handout as the educational strategy whereas Wyka et al. (1980) provided five weeks of classes that not only focused on information, but also behaviors important for control of hypertension. The measures of compliance are as varied as the educational interventions ranging from self-report only, objective criteria such as medication counts or laboratory data, or outcome criteria such as weight and blood pressure. These discrepancies make comparison of the research difficult.

Among the entire experimental group from which the sample for this study was obtained, the principal investigators found that knowledge about hypertension was generally high at intake. Included in the instrument to measure that knowledge were the questions specific to diet. Knowledge about diet was not high at either intake or termination of the study and it did not improve. Because knowledge in general was high, the focus of the interventions was not on providing information, although when deficits were identified in a nurse-client interaction they were addressed. Perhaps if data

concerning the level of diet knowledge (especially for the subset prescribed diet) had been available, the outcome of the study concerning the relationship of knowledge about diet to diet compliance may have been different. A more rational conclusion, however, is that knowledge about diet, in terms of factual information, may not be related to compliance with diet.

Considering the findings from this study and those in the literature, providers of care to hypertensive clients should not assume knowledge will lead to compliance with diet. On the other hand, knowledge cannot be ignored because without adequate information to carry out the regimen, compliance is not possible (Becker, 1979). Whether or not knowledge is related to compliance, clients have a right to information about treatment regimens (Glanz and Scholl, 19891). Knowledge levels should, therefore, be assessed at each interaction and deficits addressed so that compliance with diet is possible.

Question 1b. Is there a relationship between client perceived benefits of diet scores and compliance with diet before and following an experimental nursing intervention?

There was a positive and significant relationship between perceived benefits of diet and diet compliance both at intake and termination of the study. The relationship between belief in the benefits of treatment and compliance with the treatment regimen is supported in the literature by major reviewers of compliance studies (Becker, 1979; Janz & Becker, 1984; Lousteau, 1979; Mikhail, 1981). Several individual researchers who obtained data from intervention studies concerning diet compliance also support the relationship

between perceived benefits of treatment and compliance (Cummings et al., 1982; Maiman et al., 1977; O'Connell et al., 1985; Wyatt et al., 1980).

The measurements of perceived benefits, like those of knowledge and compliance, are inconsistent among studies. Becker (1979) and Janz and Becker (1984) cite the measurement inconsistencies as a major problem in attempts to compare findings among compliance studies.

The principal investigators of the original study from which this sample was obtained reported that hypertensive clients did not appear to have distinct cognitive differences in beliefs concerning barriers and benefits of diet and so the final tool utilized to measure benefits of diet was a commitment to diet scale derived from the variables with the highest correlations on the subscales measuring benefits and barriers of diet. The relationship of benefits and barriers is supported by Cummings et al. (1978) who found a strong negative relationship between the two measures. The recommendation, based on this finding, is to not treat the two concepts as separate entities (Cummings, et al., 1978). It must be kept in mind that the positive findings concerning the relationship between perceived benefits of diet and compliance with diet in this study are a reflection of not only believing the diet is beneficial, but also perceiving fewer barriers to following the prescribed diet.

Based on the findings, both benefits and barriers should be assessed in relationship to diet. If inappropriate beliefs or specific barriers are identified, they should be addressed using whatever resources are available and necessary. Nurse providers, in particular, have the nutritional expertise to provide the information

to improve perceptions concerning the benefits of diet and to provide the skills to overcome barriers. Nurses also have the necessary counseling and coordinating skills to assist with mobilizing the necessary resources for assisting clients to overcome barriers to dietary compliance.

Question 1c. Is there a relationship between knowledge scores about diet and perceived benefits of diet scores before and following an experimental nursing intervention?

There was no relationship between the scores measuring knowledge about diet and perceived benefits of diet at either intake or termination of the study. The accuracy of findings from this study concerning knowledge about diet are questionable due to the low reliability of the instrument.

The only researchers who specifically addressed the relationship of knowledge to perception of benefits are Given et al. (1978). Inui et al. (1976), in an experiment involving provisions for physician tutorials about the health belief model, found that clients of those physicians who were tutored were not only more knowledgeable about the treatment regimen for hypertension, including diet, but also had more appropriate beliefs concerning efficacy of treatment. The two variables, however, were not correlated. In a review of the health belief model, Lousteau (1979) suggests that misunderstandings the client may have about illness and treatment can contribute to inaccurate beliefs. Anderson (1982) points out that clients with chronic disease must have adequate information to believe that they are at risk for complications and that following the treatment regimen will decrease that risk. Although knowledge alone does not ensure

appropriate beliefs, it can become the basis for developing such beliefs (Given & Given, 1983).

The lack of relationship between knowledge and perceived benefits concerning diet in this study may have been influenced by the measurement difficulties. Another explanation is that many providers do not emphasize the role of diet as a critical component of the treatment plan since compliance with diet is difficult to establish and maintain (Glanz, 1980). Therefore, perhaps the role of diet was not stressed as an important part of the overall regimen early in treatment. Participants in this study had a mean duration of 3.4 years and so were exposed to intervention by physician providers far longer than they were exposed to the nursing intervention. Physician providers often do not take the necessary time to assure that clients have the appropriate perceptions concerning diet nor the necessary information. Given that perceived benefits and fewer barriers are related to compliance, than at the very least, hypertensive clients need adequate information concerning the relationship of diet to blood pressure and the necessary skills to overcome barriers. Providers of care to hypertensive clients should increase their own knowledge about the role of diet and assess their perceptions concerning beliefs in the benefits of diet. Certainly if the provider does not believe that diet is worth the effort it takes to foster compliance, that will have an impact on the client's perceptions. Dietary regimens should receive at least as much attention from providers as pharmacological treatment and perhaps more since the behavioral changes necessary for compliance are more complex (Glanz, 1986). The clinical nurse specialist in

primary care is the ideal provider of the care hypertensive clients require for compliance with diet.

Question 2. Is there a relationship between compliance with diet and blood pressure before and following an experimental nursing intervention?

There was no relationship between compliance with diet and either systolic or diastolic blood pressure at intake or termination. There was also no relationship between the change in diet compliance (which significantly decreased) and change in blood pressure (which significantly improved).

An explanation for this finding is that, among the participants, diet compliance was not high at either intake or termination (2.7 and 2.5 respectively with a range of 1-5) and compliance with diet became significantly worse. Compliance with medications was very high among the participants of this study and remained high and significantly correlated with blood pressure levels, a finding well supported in the literature (Green et al., 1979; Haynes et al., 1982; Hershey et al., 1980; Inui et al., 1976; Morisky et al., 1980; Sackett et al., 1978; Widmer et al., 1983). Early intervention sessions by the nurses focused on medication compliance which is another explanation for why diet compliance not only did not improve, but supports the highly significant relationship between medication compliance and blood pressure. Post study interviews of the clients by the principal investigators were conducted and a finding was that as the nurse-client relationship progressed, clients responded more honestly to the issue of compliance both with medications and diet. This certainly helps to explain why compliance with diet appears to have

significantly declined and why compliance with medication did not significantly improve.

There are contradictory findings in the literature concerning the relationship of compliance with a low sodium diet and blood pressure. Nugent et al. (1984) found that even though participants complied with a low sodium diet as measured by less urine sodium excretion, there was no significant improvement in blood pressure. Other researchers found that clients who complied with low sodium diets as measured by urine chloride titrator sticks did have have significant improvement in blood pressure (Kaplan et al., 1982; Luft et al., 1984; Sloan, 1985). Researchers who controlled sodium intake in their studies but did not address the issue of compliance, also had contradictory results. Most notable are the two double blind, controlled experiments conducted by MacGregor et al. (1982) and Watt et al. (1983) that had exactly opposite results concerning the relationship of sodium intake to blood pressure.

The researchers who examine the effect of weight loss on blood pressure demonstrate that there is a positive relationship (Gillum et al., 1983; Heyden et al., 1984; Hunt & Margie, 1980; Jeffery et al., 1983; Langford et al., 1985; Ramsey et al., 1978; Reissen et al., 1978; Stamler et al., 1980). These studies, however, do not address the issue of compliance. Weight and blood pressure were the outcome criteria.

In spite of the lack of support in this study for the relationship of diet compliance to blood pressure, low sodium intake and weight loss are clearly related to a decrease in blood pressure. Even if not viewed as definitive treatment for hypertension, providers

should consider that perhaps low sodium and low calorie eating can decrease the need for medication. Diet should, at least, receive as much attention in the treatment regimen as medication. Providers, however, must have an adequate understanding of the data available that supports the relationship between sodium and weight and blood pressure and share this information with hypertensive clients.

Other Findings

The other findings that will be discussed include the significant changes that occurred among the variables from intake into the study to termination and the relationships concerning beliefs in the benefits of treatment in general and the major study variables. A correlated t test was computed to test the effect of the intervention on the major variables. The significant results, some of which have been already mentioned, were a significant decrease in compliance with diet and both systolic and diastolic blood pressure, and an increase in belief in the benefits of treatment for hypertension. With regard to belief in treatment efficacy, there was a significant and positive relationship between that and knowledge about diet at intake only. There was also a significant negative relationship between perceived efficacy of treatment in general and perceived benefits of diet.

Some of the explanations for these findings have been discussed elsewhere. In review, the fact that medication compliance was high and remained high explains the significant relationship of medication compliance to improvement in blood pressure. The fact that diet compliance declined may be related to the order of the intervention, which focused on medications first, or that clients responded more honestly to questions concerning diet compliance at termination.

Since perceived efficacy of treatment in general significantly improved and was negatively related to perceived benefits of diet, another explanation is that these clients believed more firmly that the medication regimen was more beneficial for control of their blood pressure and so felt it was more important to comply with the medication prescriptions. Considering the order of the intervention, that belief was probably reinforced by the nurse providers. It will be recalled that the mean duration of hypertension the participants was 3.4 years. Therefore, subjects had been exposed to other providers for far longer than the six months of the nursing intervention. Clients may have developed strong beliefs in medication as the primary treatment for hypertension before the intervention. Since beliefs in the benefits of treatment and perceived benefits of diet were negatively correlated, perhaps these participants believed that the medications and not the diet were the actual treatment for hypertension. The fact that most of the research concerning treatment for hypertension involves pharmacological measures only, indicates that providers also believe this to be true.

The small correlation between beliefs in the benefits of treatment in general and knowledge about diet at intake should be viewed with the same caution as the other findings with regard to knowledge due to measurement problems. It must also be remembered that knowledge about diet was low at intake and remained so at termination. Perhaps the relationship can be explained again by the possibility that these clients did not perceive diet as an important part of the treatmeht regimen.

Based on these findings, more attention should be given to diet during treatment interactions. Clinical nurse specialists are ideal providers of the care hypertensive clients need for the clients to have appropriate perceptions of the benefits of diet and the skills to overcome barriers to following the diet. Clients should have the necessary information about the relationship of sodium and weight to blood pressure and believe that diet is an important part of the treatment regimen. There is no doubt, based on findings in this study and other research, that medication compliance improves blood pressure so efforts to foster medication compliance should also be part of any treatment plan. It must be remembered, however, that the skills required to take medications are far less complex than those required to comply with diet and require far less commitment (Glanz, 1986).

In sum, the lack of relationship between knowledge about diet and compliance with diet found in this study is supported in the literature. The accuracy of the findings are questionable due to measurement problems. The fact that perceived benefits of diet was related to compliance with diet is supported in the literature, but must be interpreted as to include fewer perceived barriers to following the diet. The fact that knowledge about diet and perceived benefits of diet were unrelated may be due to measurement problems. This finding is not supported by the literature. Only the extraneous variable of medication compliance was consistently and significantly correlated to improvement in blood pressure. The fact that compliance with diet declined may be related to the order of the intervention, the belief that medication compliance was more beneficial for treatment, or the more honest response of participants at termination

of the study. The fact that belief in the benefits of treatment was negatively associated with perceived benefits of diet supports the conclusion that among these participants, there may not have been a great deal of value placed on following the prescribed diet.

There is a discussion of the implications of these findings for nursing practice, education and research in the remainder of this chapter. Included will be a readjustment of the model used as a basis for this study which incorporates data from the findings.

Implications for Nursing Practice

This section will describe the implications for nursing practice based on the research focusing on the role of the clinical nurse specialist. Based on the literature, there is no doubt that nurses have a critical role in assisting hypertensive clients to comply with therapeutic regimens, including diet. The Task Force on the Role of Nursing in High Blood Pressure Control (1981) developed guidelines for nurses caring for hypertensive clients stating that nurses are an invaluable resource in providing primary care to clients with uncomplicated hypertension.

Although the nursing intervention in this study had no significant impact on diet compliance, the explanations for this must be kept in mind. The order of intervention, the mind-set of the participants from previous experience, and the increase in honesty to compliance questions are all possible explanations for the finding. The six month intervention time may not have been long enough to alter dietary behavior. While medication compliance involves adding new behaviors, diet compliance requires changing old, perhaps long standing behaviors which are more complex, require multiple decisions

throughout each day, and has a social impact (Given et al., 1984; Glanz, 1980, 1986). At any rate, nursing should not abandon efforts to increasing dietary compliance or be considered as ineffective in these efforts based on the results of this study. If other providers, such as physicians, do not choose to focus on diet, than, at least, they should not undermine its importance. The clinical nurse specialist should have control over the care needed to foster diet compliance and certainly, he/she is educationally qualified to render such care.

Although diet compliance was not related to blood pressure improvement in this study, there is sufficient support in the literature (cited earlier) that both restricted sodium intake and weight loss contribute to improved levels of hypertension. Nursing should, therefore, continue to foster behaviors to promote compliance with these regimens. Participants in this study had low levels of dietary compliance which is a finding supported by the literature (Glanz, 1980, 1986). In order to provide appropriate care for hypertensives on a dietary regimen, nurses must pay constant attention to nonadherence and explore solutions to dietary compliance problems (Grim & Grim, 1982; Heine, 1981; McCord, 1986).

Exploration of compliance problems can occur within the nursing process framework applying King's theory, the research concerning the health belief model, and the roles of the clinical nurse specialist. In Figure 8, a combined model for care of hypertensive clients to foster diet compliance is presented.

Modifying Factors

The major modifying factor explored in this study was knowledge about diet. While the data analysis from the sample in this study did not result in information that knowledge either effected perceived benefits of diet or compliance with diet, the limitations previously mentioned concerning these findings must be considered. It must also be kept in mind that the sample in this study did not have characteristics similar to typical hypertensives in the United States. Therefore, it would be inappropriate to conclude that knowledge about diet is not related to either perceived benefits, or for that matter fewer barriers, or to diet compliance. While knowledge does not guarantee compliance, without adequate information, clients cannot comply (Becker, 1979; Becker & Maiman, 1980). Knowledge about diet should remain in the model as a modifying factor and as an influence on actions taken by hypertensive clients both before and following nursing intervention.

Based on results of this study, age, sex, and duration of hypertension should be included in the model as modifying factors. Since younger clients perceived more benefit of diet and/or fewer barriers, nurses should more carefully assess the older client to determine their perceptions concerning these beliefs. Younger clients also complied better with diet which suggests that nurses should focus more attention on diet compliance problems of the older hypertensive. Since those participants with longer duration of diagnosed hypertension had slightly more belief in benefits of diet,

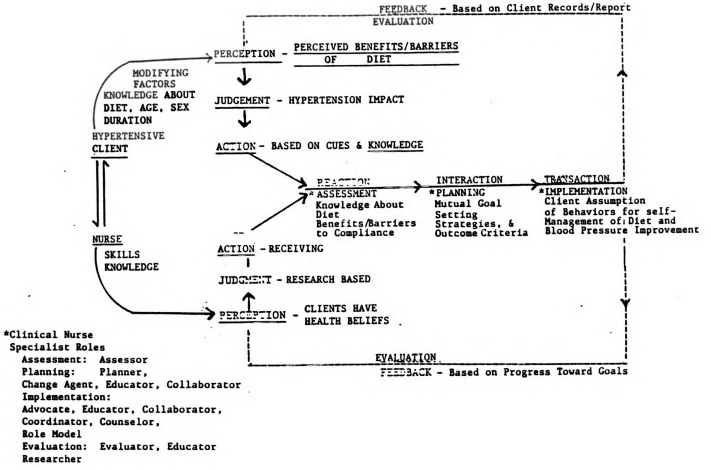

Figure 8

Combined model for the care of hypetensive clients to foster participation in the dietery regimen.

nurses should increase efforts to foster appropriate beliefs in the benefits of diet with newly diagnosed clients early in treatment. While sex was not related to perceived benefits of diet, females did have slightly more knowledge about diet and complied better with diet. Nurses should, therefore, more carefully assess the male hypertensive for adequate knowledge and for dietary compliance.

Since other sociodemographic variables had no relationship to the study variables, they were not added to the model. It must be kept in mind that the relationship between sociodemographic variables and compliance are, at best, inconsistent (Becker, 1979; Becker & Maiman, 1980; Glanz, 1980; Janz & Becker, 1984). Nevertheless, future research may have results that suggest those client groups that may be higher risk for noncompliance, especially with diet.

Perception, Judgment, and Action

A finding in this research was a positive relationship between perceived benefits of diet and compliance with diet. Based on the difficulty encountered with developing a reliable instrument that distinctly measured benefits and barriers with regard to diet, the dimension of perceived barriers should be added to the combined model. As indicated by the model, the hypertensive clients perceptions of dietary benefits and barriers influence judgment and action along with knowledge, and so the behaviors (reactions) the client brings to the nursing intervention. The reactions of concern are compliance with diet.

The Nursing Intervention

The nursing interventions to foster diet compliance for hypertensives should involve application of the nursing process in an

accepting and nonjudgmental atmosphere that promotes open communication (reaction and interaction) between the nurse-provider and the client (Connelly, 1984; Grim & Grim, 1981). The first role of the Clinical Nurse Specialist (CNS) is that of Assessor. The assessment process is influenced by the CNS role of Researcher since data gathering is research based. In addition to the sociodemographic variables already discussed, assessment, should include the perceptions the client has concerning benefits and barriers related to diet, and whether or not the client's belief in the general efficacy of treatment for hypertension, includes diet. Knowledge about the dietary prescription should also be included in spite of findings from this study. According to the Working Group in Critical Patient Behaviors for Dietary Management of High Blood Pressure (Working Group, 1982), the client's understanding and acknowledgement of the diagnosis of hypertension, current perception regarding how a low sodium and/or low calorie diet will influence blood pressure, current dietary practices, and obstacles perceived to interfere with diet compliance should all be assessed.

After assessment data is gathered, the nursing diagnosis should be identified. Nursing diagnoses should include the etiology of the problem (Gorden, 1984). Based on findings from this study, the model discussion will proceed using the diagnosis of nonadherence to diet. However, considering the fact that diet compliance requires voluntary and active participation of the client (Given et al., 1984); Glanz, 1980; Working Group, 1982), a more appropriate diagnosis may be nonparticipation in the diet regimen. Using the findings from this research, the nonparticipation may be related to rule out lack of

knowledge, skills, inadequate perception of benefit of diet, or excess barriers to following the diet resulting in noncompliance with diet. Continuous assessment and critical thinking and judgment about data should rule out etiologies.

As a Planner, the CNS should apply the additional roles of Change Agent, Collaborator, and Educator. Based on the recommendations of the Working Group (1982), planning should include mutually developing dietary and blood pressure goals and strategies to meet the goals. As a change agent and educator, the professional should assist the client in recognizing that successful dietary change requires effort over an extended period, and to be beneficial, maintenance of the change is life-long. The nurse should assist the client with goal setting by providing appropriate information concerning the benefits of following a low sodium or calorie restricted diet and collaborating with the client with plans to overcome obstacles to following the prescribed diet. It is important for the CNS as planner, change agent, collaborator, and educator to assist the hypertensive client with planning strategies to make the necessary diet changes within the context of current lifestyle. Collaboration is based on mutual exploration and implies joint responsibility for the development of plans for the steps necessary for dietary changes. The nurse can assist the client by providing examples of steps needed based on the assessment data and based on the client's individual obstacles and resources (Working Group, 1982).

The final step in planning should be mutually determining outcome criteria so that both the client and the nurse are able to determine success of the strategies. Throughout the planning process, the CNS

should provide accurate and adequate information to aid in client decision making. Contracting for behavior change has been a successful strategy to foster compliance used by several nurses (Brykczynski, 1982; Moughton, 1982; Steckel & Swain, 1977; Steckel, 1982). The collaborative skills necessary are generally beyond the scope of undergraduate education.

Implementation of the plan, transaction, means the client has assumed the responsibility for the dietary behaviors necessary for dietary compliance and blood pressure improvement. As the client attempts each step of the plan, the CNS functions as Clinician (participating in measuring outcomes and providing support). As clinician, the CNS formulates the nursing diagnoses and provides the necessary care, based on sound theory and advanced clinical judgment, to promote client participation in the dietary regimen. The CNS also functions as Consultant to assist the client to overcome obstacles and develop resources for dietary compliance. As consultant, the CNS uses problem solving skills to provide both advice and information necessary for the client to carry out the dietary regimen, but the decision and accountability for following the recommendations rests with the client. Effectiveness as both consultant and collaborator requires that the CNS trust in the client's capabilities and that the client perceives the CNS as credible.

In order for the medical treatment plan to be effective, the CNS also functions as Coordinator (reinforcing the medical treatment plan). As coordinator, the CNS has the responsibility to identify the needs of the client and promote and necessary behaviors to meet those needs using both the medical and nursing care plans. An additional

CNS role to foster client participation in the medical and nursing plan is that of Counselor. As counselor, the CNS provides encouragement and support for the client to express concerns about the illness and problems associated with following the treatment plan. The CNS assists the client to utilize problem solving skills to overcome barriers to participation in the dietary regimen. Effectiveness in the role of counselor requires that there is mutual trust between nurse and client and that the nurse communicates, both verbally and nonverbally, a caring and concerned attitude. In the counseling relationship, the nurse and client are partners in problem solving, but it is the client that has the principal responsibility for following through with the necessary behaviors for self-care.

As a Role Model, the CNS must demonstrate problem solving skills. The client must perceive that the nurse has skill worthy of emulating. It would, therefore, be inappropriate for nurses who are overweight to provide care to clients who are attempting to control calorie consumption. The CNS also role models appropriate client interaction to foster diet compliance to coworkers.

Throughout intervention, the CNS should be available to provide whatever assistance necessary and possible for the client to self-manage the dietary regimen (Working Group, 1982). Fostering compliance requires that the nurse-provider be willing to invest time and effort to assist the client to understand and implement the needed behaviors (Moughton, 1982). The CNS is educationally prepared to implement the necessary nursing roles to foster client participation in a dietary regimen for hypertension. The CNS has the advanced knowledge to understand the complexity of factors that contribute to

compliance and the skill to apply theory using critical thinking and sound judgment for creativity and flexibility in care planning.

Evaluation and feedback should involve mutual determination of the success of the dietary change goals. The methods mutually identified in the planning phase should be the basis for measurement. Client involvement in the process should be included and can be encouraged by recommending record-keeping techniques to the client. If goals are not reached, the nurse and client should mutually explore possible explanations. Even if goals are not reached, the client should receive praise and reinforcement for efforts. The client must believe that he/she will not be abandoned by the CNS if success is not immediately apparent. Care must be taken when providing feedback so that the client does not have perceptions of failure, but rather perceptions of having the power and skills to overcome difficulties in complying with the diet. Reinforcement of problem-solving efforts helps foster these perceptions. When exploring possible explanations for problems in meeting the goals, the nurse should also assist the client to evaluate how realistic the goals and strategies are given the client's lifestyle and resources. The nurse should also consider how much the client actually participated in the establishment of the goals and strategies since this would influence the amount of responsibility the client perceives in following through with the plan.

If the goals are reached, the CNS should provide praise and reinforcement for the behaviors that led to goal attainment. The client who is successful requires support and encouragement to maintain the necessary behaviors for participation in the dietary

regimen. Along with reinforcement of goal attainment, the client should receive feedback and praise concerning the self-monitoring techniques utilized so that long term effectiveness can be maintained.

Active participation of clients in the process of care has been found successful by several nursing experts (Conway-Rutkowski, 1982; Given et al., 1979; Padrick, 1986; Shulman, 1979; Steckel, 1982). There is no doubt that the complexity of changes required for dietary adherence requires active involvement of the client (Glanz, 1980; Working Group, 1982). A sample care plan for the proposed nursing diagnosis of "nonparticipation in the diet regimen" is found in Appendix D.

In sum, the clinical nurse specialist has the necessary skills, advanced knowledge, and clinical judgment to provide appropriate care to hypertensive clients to foster diet compliance. Basing nursing intervention on the nursing process, using nursing theory, and research from the health belief model, fosters active client involvement and, therefore, increases the likelihood of success. The clinical nurse specialist, as a master's prepared professional, can contribute to the body of nursing knowledge by applying research results and established theory as the nurse functions in the roles that are included in the educational preparation of the CNS. Each of the roles are illustrated in the combined model for care of the hypertensive client to foster participation in the dietary regimen (Figure 8).

The application of research findings to the care of hypertensive clients to foster participation in the dietary regimen has some

implications for nursing education. Those concerns are addressed in the following section.

Implications for Nursing Education

Nurses, as the largest group of health professionals, have more contact with hypertensive clients than any other health care provider. As a result, the nurse has more opportunity to influence health related behaviors.

While most nursing education programs address the pathophysiology of hypertension and the recommended treatment, few deal with the major problem of hypertension management: assisting the client to develop the necessary knowledge, skills, and beliefs to successfully manage the therapeutic regimen, including diet. All nurses should be informed about the complexity of compliance problems, especially those associated with diet. Teaching nurses about the health belief model can promote a degree of understanding of the issues that must be addressed to promote client participation in care in order to promote dietary adherence. The ability of the nurse, at any level of education, to accurately assess, plan, implement, and evaluate to foster client participation in care, depends upon the nurse's awareness of the multiplicity of factors that contribute to adherence with diet.

Nurses must understand that client perceptions concerning benefits and barriers to diet and knowledge about diet are but two of the factors that may contribute to willingness and ability to engage in the behaviors needed for self-management of dietary adherence. The health belief model should, therefore, be introduced at all levels of nursing education.

Due to the complexity of nursing roles and behaviors (Figure 8), nurses who are primary care providers for uncomplicated hypertensives should be prepared at the graduate level. Along with the complexity of compliance problems, nurses prepared at the graduate level should be well informed about the strategies that foster client participation in care. The CNS in ambulatory settings as case managers should also be prepared to collect data to identify the defining characteristics of nonparticipation in the therapeutic regimen, specifically related to diet and to develop and test additional strategies for intervention. These behaviors require extensive educational preparation in a research based program.

Education in appropriate collection of data would not only contribute to the body of nursing knowledge, it would also provide a mechanism to justify third party reimbursement to primary nurse-providers. Demonstrating effectiveness in meeting measurable outcomes in a cost saving manner may influence decision makers concerning the appropriateness of direct reimbursement to nurses. Noncompliance contributes to health care costs by increasing the incidence of severity of illness, contributing to complications, and leading to longer and more extensive treatment including the possibility of hospitalization (Connelly, 1984). Nurses who are educationally prepared to foster compliance with regimens, including diet, can contribute to cost containment in health care and to the health of the nation.

More emphasis should be placed on the effectiveness of diet as a treatment for hypertension in schools of nursing as well as schools of medicine. While all experts do not advocate the widespread use of

diet as a sole intervention, the Joint National Committee (1984) states that nonpharmacological measures should be vigorously pursued for those clients with uncomplicated mild hypertension and as an adjunct to pharmacological treatment for all hypertensives. Many researchers support this position (Brandt, 1983; Egan & Julius, 1983; Flamenbaum, 1983; Kaplan, 1983, 1984; McAlister, 1983; Moser, 1984; Pickering, 1983; Zeigler, 1983). Langford et al. (1985) found that participants who complied with diet could be successfully withdrawn from many antihypertensives or have dosages lowered, thus decreasing the side-effects associated with long term pharmacological treatment.

In spite of the evidence supporting dietary intervention for hypertension and the recommendations of the Joint National Committee, many physician providers begin treatment with medications even for uncomplicated, mild hypertension (Thomson et al., 1981). If providers considered the iatrogenic effects of drug treatment for hypertension when planning care, such as hypokalemia, elevated blood glucose, hyperuricemia, and elevations in serum cholesterol (Egan & Julius, 1983; Flamenbaum, 1983; Kaplan, 1983), perhaps dietary intervention would be more actively pursued and more time spent in fostering the behaviors necessary for clients to self-manage dietary intervention. If more value were placed on dietary strategies by providers, perhaps more research dollars would be available to foster exploration of dietary compliance issues.

Implications for Future Research

The problems associated with compliance studies have been discussed throughout this paper. Inconsistencies in definitions and measurements of the concepts related to compliance is a serious

short-coming in the research to date. The difficulties in comparing results is related to the inconsistencies, not only with regard to the concepts thought to influence compliance, such as knowledge and perceived benefits and barriers, but also the inconsistencies in the measures of compliance.

A number of recommendations for future research can be suggested based on this study. The recommendations are based on the limitations suggested in interpreting the findings as well as the limitations found in other compliance research.

It is imperative that further research be conducted to determine factors that contribute to active client participation in dietary treatment for hypertension. The relationships of knowledge about diet and perceived benefits/barriers of diet to dietary compliance and to each other are two of the concepts from the health belief model that require further research. It is also critical to study the relationship of dietary compliance to blood pressure control since there is evidence that diet can be a sole intervention for some hypertensives, and can lower the need for medications in others as previously cited. In order to obtain the data necessary for effective, research-based practice, the activities that follow are necessary.

The concepts of the health belief model should be defined and these definitions used consistently among researchers. Instruments to measure each of the concepts should also be designed and vigorously tested for reliability and validity before use. Once reliable measures of the concepts are found, the measures should be used repeatedly so that research findings can be compared. It is

recommended, based on this study, that an instrument designed to test knowledge about diet should be specific to the type of diet prescribed and should also be a measure of the skills the client has as well as the cognitive information. Instruments that clearly differentiate benefits and barriers to following the prescribed diet should also be developed. Only with reliable and valid instruments, can accurate conclusions be reached and effective interventions be developed.

The definitions and measurements of compliance to diet must also be consistent in future research so results can be compared. Self-report of compliance has been demonstrated as a very reliable measure by several researchers (Glanz, 1986; Gordis, 1979; Haynes et al., 1980; Helber, 1985; Morisky et al., 1986; Waxman, 1981). The study conducted by Morisky and colleagues (1986) tested the concurrent and predictive validity of a self-report measure of medication adherence with excellent results. Similar testing should occur with self-report measures of diet compliance. Objective measure of diet compliance should also be included in studies to assist with validation of self-report measures. Glanz (1986) states that validity of self-report of adherence to low sodium diets can be assessed with 95% accuracy using 24 hour urine sodium excretion and with acceptable accuracy using overnight collections and analysis with chloride titrator sticks.

Objective criteria for compliance with weight loss regimens are more difficult to establish since actual weight loss is influenced by individual metabolic and activity differences as well as food consumption. Weight loss, however, can be considered as related to, but not the same as, low calorie eating (Glanz, 1980, 1986). Most

importantly, measures of diet compliance must be feasible, easy to interpret, valid, and reliable (Glanz, 1986). It is imperative that nurse researchers develop and test compliance measures.

Future exploratory research concerning measurements of the relationship of the variables used in this study should also be conducted using samples that more closely resemble the majority of hypertensives in the United States. Findings from such studies would be more useful for making generalizations to the hypertensive population.

Finally, it is recommended that experimental nursing intervention studies, using reliable and valid instruments to measure knowledge about diet and determine benefits and barriers concerning diet be conducted. One such study should be among randomly selected newly diagnosed hypertensive clients that are prescribed low sodium and or weight loss diets as the sole intervention. The nursing intervention should specifically focus on fostering client participation in the dietary regimen. The impact of the intervention on dietary compliance could then be more clearly measured as well as the relationship of dietary compliance to improvement in blood pressure. The clients in such a study should be followed across time to determine if knowledge, perceptions, and dietary compliance are maintained. Longitudinal studies are especially important to study diet compliance because the behavior required is difficult and adherence is expected for a life time. Such studies would provide information related to the amount and type of follow-up important to maintain the client's participation in the dietary regimen.

Other studies with a similar methodology should be conducted among clients with various durations of hypertension and who are also receiving medications. In these studies, it would be important to control for the effect of medications on blood pressure. It would also be important that providers of the intervention stress the relevance of diet at onset so that participants view diet as an essential component of the treatment plan.

Considering the recommendations of the JNC (1984) that diet be considered as a first step in the treatment of uncomplicated mild hypertension, studies should be conducted among clients with blood pressures meeting that criteria. Evidence of the efficacy of such treatment will contribute to provider belief that fostering client behaviors necessary for participation in a dietary regimen are worth the time and effort required.

Based on the findings from this study, the research questions addressed need further exploration. It is also imperative that other questions concerning dietary treatment for hypertension be considered in future research. Such questions include: How do providers perceive the effectiveness of low sodium and/or weight loss diets as contributing to blood pressure control? What are providers currently doing in their practice to foster diet compliance? What other perceptions and beliefs are important to diet compliance? Who are the most appropriate providers to foster client participation in a dietary regimen for hypertension? Answers to these questions can be used to provide education for all providers caring for hypertensives to at least maximize the effectiveness of diet as a treatment for hypertension.

Summary

There are results from this study that indicate compliance with low sodium and/or calorie restricted diets among hypertensives is a problem. Although there was no evidence from this study that knowledge about diet influenced either perceived benefits/barriers or compliance with diet, measurement problems may have been a major contributor. Therefore, client knowledge should not be abandoned as an important area to assess and intervene through educational efforts and client skill development. The hypertensive client needs certain information and skill in order to carry out any therapeutic regimen, and certainly one that requires complex behaviors such as those required for low sodium and/or low calorie eating.

There is information from this study, well supported in the literature, that perceived benefits or fewer perceived barriers are related to diet compliance. Therefore, client perceptions concerning these beliefs should be assessed and addressed.

King's nursing theory along with the nursing process and research findings related to the health belief model can be utilized to foster the necessary skills, knowledge, and beliefs that promote self-management for dietary compliance among hypertensives. The framework can also be used to further measure the concepts of knowledge about diet and perceived benefits and barriers concerning diet as they relate to compliance and to each other. The framework can be used for future research to test nursing interventions thought to promote client self-care through diet compliance and the impact that self-care has on blood pressure control.

The information in Chapter VI includes the major findings from this study. A description and analysis of the research sample was presented and compared to those of other studies. Findings from this study were discussed and compared to those of past researchers. Also included are recommendations and implications for nursing practice, education, and research.

APPENDICES

APPENDIX A

APPENDIX A

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

APPENDIX B

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 service provided me will not change. I understand that I can withdraw from participating at any time.

4. I understand that the results of the study will be treated in strict confidence and that should they be published, my name will remain anonymous. I understand that within these restrictions results can, upon request, be made available to me.

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

Signed _____
(Signature of Patient)

Date _____

APPENDIX C

APPENDIX C

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 status (CHECK ONE)

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

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

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

6. How much schooling have you had (highest grade completed)? (CHECK ONE)

   1. None or some grammar school (less than 7 grades completed) _____
   2. Junior high school (9 grades completed) _____
   3. Some high school (10 or 11 grades completed) _____
   4. Graduated high school _____
   5. Technical business, or trade school _____
   6. Some college (less than 4 years completed) _____
   7. Graduated college _____
   8. Post-graduate college or professional _____

7. Do you have hypertensions?

   1. Yes _____ 2. No _____

8. If yes, how long have you had hypertension?

   1. Less than one year _____
   2. One to two years _____
   3. Three to five years _____
   4. Six to eight years _____
   5. Nine to eleven years _____
   6. Twelve to fourteen years _____
   7. Fifteen years or more _____

UNDERSTANDING HIGH BLOOD PRESSURE (DIET)

AN IMPORTANT PART OF LIVING WITH HIGH BLOOD PRESSURE IS TO UNDERSTAND THE DISEASE PROCESS AND THE TREATMENT PRESCRIBED FOR YOU. BELOW ARE A SERIES OF QUESTIONS THAT WILL HELP US UNDERSTAND WHAT YOU KNOW ABOUT HIGH BLOOD PRESSURE. PLEASE CHECK THE ONE CORRECT OR BEST ANSWER FOR EACH QUESTION. IF YOU ARE UNSURE ABOUT THE CORRECT OR BEST ANSWER FOR ANY QUESTION, ANSWER WITH YOUR BEST GUESS.

CHECK ONLY ONE ANSWER FOR EACH QUESTION.

1. When you are on a diet and are preparing meals for your family you should:

   _____ 1. Use dietetic foods as much as possible.
   _____ 2. Use prepared soups rather than gravies as sauces for meets.
   _____ 3. Use a meat rack while roasting foods.

2. Select from the following foods those that are low in salt content:

   _____ 1. Onions, beef roast, baked potato.
   _____ 2. Boullion cubes, processed cheese, onions.
   _____ 3. Canned soups, ketchup, potatoes.

3. Which of the following tips would be helpful for people trying to lose weight?

   _____ 1. Eat from a larger plate so it looks like you are eating more food.
   _____ 2. Combine meals so you don't eat so much throughout the day.
   _____ 3. Do not fix different for yourself than for your family.

4. A good way way to lose weight would be:

   _____ 1. Eat as many foods as possible that are organic or "health foods."
   _____ 2. Eat as many foods as possible that are high in protein.
   _____ 3. Eat a diet balanced in protein, carbohydrates, and fats.

5. The usual treatment for high blood pressure includes:

   _____ 1. Medicines to control blood pressure and diet to control weight.
   _____ 2. Diet to control the blood sugar.
   _____ 3. A low potassium diet to control the heart rate.

6. Of the following meal plans, the best menu for a reduced calorie, low salt diet for the hypertensive patient would be:

_____ 1. Salad, chicken, potato chips, pudding, low-fat milk.
_____ 2. Salad, pickles, ham, low-fat milk.
_____ 3. Salad, veal, fruit juice, gelatin.

7. If weight control or a weight reduction diet is to help reduce blood pressure, it will:

_____ 1. Help control high blood pressure by decreasing the work of the heart.
_____ 2. Work best if 2½ - 3 pounds are lost each week.
_____ 3. Require that the ideal body weight be achieved quickly to help the medication work more effectively.

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 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 WRONG ANSWERS.

PLEASE ANSWER ALL QUESTIONS IN THE FOLLOWING WAY.

IF YOU STRONGLY AGREE WITH THE STATEMENT, THEN CIRCLE STRONGLY 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 STATEMENT, THEN CIRCLE STRONGLY DISAGREE.

Efficacy of Treatment

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

   Strongly Agree Agree Undecided Disagree Strongly Disagree

2. 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

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

   Strongly Agree Agree Undecided Disagree Strongly Disagree

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

   Strongly Agree Agree Undecided Disagree Strongly Disagree

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

   Strongly Agree Agree Undecided Disagree Strongly Disagree

6. 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

Benefits of Diet

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

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

   Strongly Agree Agree Undecided Disagree Strongly Disagree

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

   Strongly Agree Agree Undecided Disagree Strongly Disagree

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

   Strongly Agree Agree Undecided Disagree Strongly Disagree

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

    Strongly Agree Agree Undecided Disagree Strongly Disagree

11. I believe that my diet will help prevent diseases (complications) related to high blood pressure.

    Strongly Agree Agree Undecided Disagree Strongly Disagree

12. I must follow my diet even if I don't think I am getting better.

    Strongly Agree Agree Undecided Disagree Strongly Disagree

Barriers to following Diet

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

Strongly Agree Agree Undecided Disagree Strongly Disagree

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

Strongly Agree Agree Undecided Disagree Strongly Disagree

15. I could follow my diet if I had a step by step plan.

Strongly Agree Agree Undecided Disagree Strongly Disagree

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

Strongly Agree Agree Undecided Disagree Strongly Disagree

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

Strongly Agree Agree Undecided Disagree Strongly Disagree

18. I cannot understand what the doctor told me about my diet.

Strongly Agree Agree Undecided Disagree Strongly Disagree

COMMITMENT TO DIET

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

   Strongly Agree Agree Undecided Disagree Strongly Disagree

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

   Strongly Agree Agree Undecided Disagree Strongly Disagree

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

   Strongly Agree Agree Undecided Disagree Strongly Disagree

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

   Strongly Agree Agree Undecided Disagree Strongly Disagree

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

   Strongly Agree Agree Undecided Disagree Strongly Disagree

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

   Strongly Agree Agree Undecided Disagree Strongly Disagree

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

   Strongly Agree Agree Undecided Disagree Strongly Disagree

HYPERTENSION CLIENT INTERVIEW

1. Do you take _____? (Read categories. Circle answer.)

   a. all the time
   b. more than half the time
   c. half the time
   d. less than half the time
   e. none of the time

2. In the past two weeks, have you taken the prescribed dosage of _____ (name - med.)?

   (Read categories. Circle answer.)

   a. all the time
   b. more than half the time
   c. half the time
   d. less than half the time
   e. none of the time

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

   a. all the time
   b. more than half the time
   c. half the time
   d. less than half the time
   e. none of the time

4. Did the doctor suggest you follow a diet? [If no, ask: Has the doctor ever suggested you change(alter) your present diet?]

   Yes - Go to 4a-4e
   No or Don't Remember - skip to next item.

   4a. What type of diet did the doctor suggest you follow? Was it a (READ CATEGORIES)

      1. Reducing diet
      2. Low sodium diet
      3. Low cholesterol diet
      4. Low calorie and low sodium diet
      5. Low calorie, low sodium, and low cholesterol diet
      6. Low calorie and low cholesterol diet, or
      7. Some other diet? (WRITE IN) _____

4b. 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?

APPENDIX D

APPENDIX D

NURSING CARE PLAN

Nursing Diagnosis: Nonparticipation in diet regimen related to lack of knowledge, skill, inadequate perception of benefits, or barriers concerning diet resulting in noncompliance with the low sodium and/or weight loss dietary prescription.

Outcome Criteria:

The Client will:

1. Report consumption of foods consistent with the dietary prescription.
2. Have a systolic B/P of _____ and a diastolic B/P of _____
3. Will have a chloride titler of _____
4. Will lose _____ pounds

(Time perameters as well as specific indicators should be mutually established.)

Nursing Activities:

1. Assess the client's current knowledge concerning the dietary prescription (have client state the diet, provide 24-hour recall, choose appropriate foods from a list, etc.). Reassess at each visit.
2. Assess the client's current perceptions concerning the relationship of dietary behavior and blood pressure (ask how salt and/or weight effects blood pressure, how diet would help decrease symptoms or prevent complications, if diet is worth the effort). Reassess at future visits.

3. Provide written and verbal information as needed about the relationship of diet to high blood pressure and the principles of dietary management (relationship of sodium or weight to hypertension, how decreasing sodium and or weight contributes to control, how diet can decrease the need for drugs and therefore cost and side effects). Reinforce at each visit.

4. Provide written and verbal information about diet and reassess knowledge and reinforce at each visit (sample menus, shopping lists, prohibited foods, foods that can be eaten freely, other ways to season foods, how to read labels). Consider financial, ethnic and other variables for dietary planning. Reassess and reinforce at each visit.

5. Seek feedback and clarify understanding at each stage.

6. Mutually develop dietary and blood pressure goals.

7. Mutually develop a strategy for incorporating needed dietary changes into lifestyle.

8. Assist the client to develop a specific plan to implement each strategy.

9. Assist the client to anticipate obstacles to dietary compliance and to use problem solving to overcome (ask how will plan for eating in restaurants, at work, or visiting friends).

10. Mutually develop methods of measuring success at each step of dietary change.

11. Involve the client in self-monitoring for both compliance and progress toward outcomes as much as possible) monitoring urine sodium, recording weights, keeping a food diary).

12. At future visits, assist the client to assess degree of success and identify obstacles if goals are not achieved. Reestablish goals and strategies as needed.

13. Involve the client's significant other in the process as much as possible and agreed upon.

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