

BEHAVIOR MODIFICATION AND COMPLIANCE
OF HYPERTENSIVE PATIENTS TO MEDICAL REGIMEN

A THESIS
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DEDICATION

To Dr. Thomas P. Sullivan, M.D., for allowing this study to be conducted in his practice, and for sharing his knowledge, compassion, and insight about medicine and human beings for many years.

To the patients in Dr. Sullivan's practice, for their interest and encouragement and longtime friendship. They shared their lives and personal feelings to participate in this study. It is out of concern for their physical and emotional health that medicine and nursing exist, and this study is gratefully dedicated to them.

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TABLE OF CONTENTS

	<u>Page</u>
Dedication.	iii
Acknowledgements.	iv
Table of Contents	v
List of Tables	vii
List of Figures	viii

CHAPTER

I.	INTRODUCTION.	1
	Statement of the Problem.	3
	Statement of the Purposes	3
	Background and Significance	4
	Study Questions	10
	Definition of Terms	11
	Limitations	12
	Delimitations	13
	Assumptions	14
	Theoretical Framework	14
	Summary	16
II	REVIEW OF LITERATURE.	17
	Summary	17
	Pathophysiology of Hypertension	17
	Epidemiology of Hypertension.	29
	Medical Management of Hypertension.	35
	Drug Therapy.	36
	Weight Control.	46 X
	Dietary Sodium Ingestion.	49
	Cigarette Smoking	53
	Alcohol Consumption	55
	Oral Contraceptives	56
	Environmental Stress and Personality.	57 X
	Compliance	62
	Behavior Modification	76
	Role of the Nurse	
	in Hypertension Control	81
	Patient Teaching.	85
	Summary	92

TABLE OF CONTENTS (continued)

CHAPTER	<u>Page</u>
III. PROCEDURE FOR COLLECTION AND TREATMENT OF DATA	94
Introduction	94
Setting	96
Population	96
Tool	97
Data Collection.	98
Treatment of Data.	99
Summary.	100
IV. ANALYSIS OF THE DATA	102
Introduction	102
Description of the Sample.	103
Presentation of Findings	105
Description of Compliant and Noncompliant Groups.	105
The Knowledge Test	110
Interview to Investigate Life Style Changes due to Hypertension.	116
Compliance Scale	126
Summary.	128
V. SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS.	130
Summary.	130
Conclusions.	132
Implications	133
Recommendations.	135
BIBLIOGRAPHY	137
APPENDICES	
A TOOLS	151
B PERMISSION FOR STUDY	158

LIST OF TABLES

	Page
Table 1. Chart of Demographic Data.	104
Table 2. Knowledge Test Scores Distribution and Comparison of Groups.	110
Table 3. Comparison of Means of Knowledge Test Scores	112
Table 4. The Knowledge Test	113
Table 5. Hypertension Risk Factors.	119
Table 6. Salt Restriction in the Diet	120
Table 7. Cigarette Smoking	120
Table 8. Alcoholic Beverage Use	121
Table 9. Stress	122
Table 10. Heredity	123
Table 11. Medical Monitoring	125
Table 12. Comparison of Means of Compliance Scores	128

LIST OF FIGURES

	Page
Figure 1. Percentage of Frequency of Various Diagnoses in Hypertensive Patients.	23
Figure 2. Percent of Population Ages 18 to 79 with High Blood Pressure	30
Figure 3. Recommended Antihypertensive Regimens.	42
Figure 4. Steps in the Medical Treatment of Hypertension	43
Figure 5. Hypothesized Model for Predicting and Explaining Compliance Behavior.	67
Figure 6. Simplified Interpretation of the Relationships Among Variables in the Study of Adherence	73
Figure 7. Areas of Compliance	107
Figure 8. Compliance of the Group	108
Figure 9. Comparison of the Compliant and Noncompliant Group	109
Figure 10. Frequency Distribution	111

CHAPTER I

INTRODUCTION

Hypertension is a chronic disability disease which today poses a real threat to a large portion of the population of the United States. Despite the many processes available for diagnosis and treatment both in public and private health care facilities, this disease remains a major underlying cause of increased morbidity and mortality in our society. The effects of long term uncontrolled hypertension result in an increased incidence of cardiovascular disease and renal disease. To the individual both the longevity and the quality of life are reduced. To society, hypertension represents a loss in the functioning ability of many otherwise productive citizens and adds to the burden of health care costs. A major factor in uncontrolled hypertension is poor adherences of patients with medical regimen.

Even though there is no cure for this serious disease, the long term effects and complications can be reduced through control with a therapeutic medical regimen. The regimen usually involves: 1) medication, 2) weight control and salt restriction in the diet, 3) abstinence from smoking and very moderate use of alcohol, along with 4) regular medical appointments to monitor the program.

Research studies have clearly demonstrated the positive effects of compliance with medical regimen, and hypertensive control programs usually focus on patient education concerning the threat of the disease and the long term benefits of the therapy. However, hypertension is a disease without symptoms, and the real problems encountered with individuals involve denial of diagnosis and problems with adapting personal life styles to the therapeutic regimen. Medications often have unpleasant side effects, and change of diet is personally undesirable. Acceptance of a diagnosis is often threatening as it can be viewed as a personal weakness. Risk factors such as stress are difficult to identify and change. Medical monitoring is expensive and time consuming.

In view of all these obstacles, it can be hypothesized that teaching patients behavior modification may be as important as the instruction about the disease and the

medical regimen. Patients with only understanding of their disease do continue their course of noncompliance.

Statement of the Problem

What relationship, if any, exists between hypertensive patients' compliance to a therapeutic medical regimen and their institution of behavior modification techniques?

Statement of the Purposes

The purposes of the study were as follows:

- 1) To assess compliance of patients with self reports of medication compliance and records of blood pressures
- 2) To assess patient knowledge about the disease and their medical regimen to combat it
- 3) To determine if patient behavior modification patterns in response to hypertensive control regimen could be identified
- 4) To determine if a relationship existed between compliance to medical regimen and use of behavior modification techniques

Background and Significance

Hypertension ranks as a major concern in health care today. Over 23 million Americans or one out of every six persons in the population is believed to be hypertensive. Of these, only 50 percent are diagnosed and aware of their disease. Of the remaining 50 percent, 25 percent are aware of their diagnoses and receive no therapy, and another 12.5 percent receive inadequate therapy. Statistically, it appears there exists a chronic condition which contributes greatly to the national mortality rate, and of which only about 12.5 percent of its victims receive adequate medical attention.

Studies have revealed that 68 percent of all persons experiencing a first heart attack, and 75 percent of persons having strokes (cerebral vascular accidents) also are suffering from hypertension. It is evident, then, that hypertension is a contributing factor in 600,000 deaths a year. It is also estimated that the cost to the nation due to these cardiovascular diseases exceeds 24 billion dollars. That 37.5 percent of the people suffering this disease are aware of their diagnoses and still do not seek to control it with medical regimen that has been proven successful is a complex problem requiring vigorous attention (The National Health Education Committee, 1976).

Defining hypertension is difficult. It is a relative state with definable symptoms rather than a single condition. Genest states that:

Systemic arterial hypertension is a hemodynamic disease which is dependent upon many factors which may alter the relationship between the cardiac output and the total peripheral resistance.
(Genest, Koiw, and Kuchel, 1977, p. 2)

There are two kinds of hypertension: essential, the most prevalent (85 percent), and secondary (Robinson, 1974, p. 44). "Secondary hypertension results as a manifestation of a known disease or cause." (Laragh, 1979, p. 3) Treatment of the underlying process will relieve the hypertension. However, if examination and investigation of the patient with raised arterial pressure fails to detect a recognizable disease present, then the diagnosis of essential hypertension is made (Laragh, 1974, p. 21).

What is normal or abnormal is also difficult to state. Blood pressure fluctuates greatly in any individual as a normal response to the stress and physical demands made on the body. However, studies have demonstrated increased mortality is related to increased arterial pressures (Laragh, 1974, pp. 3-4). The American Heart Association (1974) recommends that the diastolic pressure should be no more than 90 mmHg if the subject is less than fifty-five

years of age and no more than 100 mmHg if the subject is more than fifty-six years of age. The readings relate to an individual at rest and experiencing no undue stress. The V.A. Cooperative Study (1970) also demonstrated that reducing diastolic pressure to below 90 mmHg was effective in reducing morbid events and in preventing complications of congestive heart failure.

In view of all these facts, then, diagnosis and control of hypertension is certainly a worthwhile endeavor. And of particular concern are all the individuals who are aware of their disease but do not seek to control it. Patient noncompliance is a major obstacle to be overcome in hypertensive therapy today.

Accepting the diagnosis is often difficult. Hypertension is a disease without symptoms. In our society illness has the connotation of being undesirable. However, when disease undeniably exists, the "sick role" allows the patient exemption from usual social roll obligations and permits the patient to be taken care of by others. The sick person is expected to seek medical supervision and to cooperate in his treatment. The person with a chronic medical regimen, in contrast, is expected to remain self-reliant and not to limit his activities or obligations during therapy. The negative connotation remains while the privileges are denied (Parsons, 1975, pp. 275-278).

In this situation noncompliance behavior is a form of deviant behavior and offers rewards of its own (Barofsky, 1977, p. 30).

Many factors are involved with patient noncompliance. In a review of studies Barsky and Gillum (1974) found that patients fail to comply with the orders of their doctors at least 33 percent of the time, and in some instances, 50 percent of the time. He describes most patient education and recommendations by physicians as involving three steps. First, the patient is given a thorough explanation of the medical regimen and a description of the disease. This is followed by a rational argument to comply with the regimen, and lastly a warning is given of the threat of the illness and its complications if the illness is untreated. About 40 percent of patients respond favorably and comply with this type of approach. However, many patients are not persuaded. Studies of noncompliers describe patients perceiving themselves as being less susceptible to actual or potential illness. They are characterized as disorganized, hostile, and as having inadequate coping mechanisms. Both high and low levels of fear can be correlated with noncompliance. Socially, noncompliers tend to have fewer people in the home and fewer support systems (Barsky and Gillum, 1974, pp. 1563-1567). In addition, Blackwell (1973)

stated that patients are more likely to lapse into non-compliance when the treatment is prophylactic, when the condition is mild or asymptomatic, or when the consequences of stopping therapy are delayed. Other problems identified included the complexity of regimens. Persons on three or more medicines often become confused. Geriatric patients frequently experience forgetfulness, and some persons fear "drug dependence." Unpleasant side-effects of medication have a strong negative effect (Blackwell, 1973, pp. 249-252). While such numerous findings as these can be confusing, they do support the need for additional types of patient support and education.

Working with the "Health Belief Model," Rosenstock (1970) found "people are more likely to seek to prevent a disease if they perceive it as being severe and see themselves as susceptible." However, motivating people to have one time treatments such as vaccinations is much simpler than influencing them to comply with life long medical regimens. His findings included that knowledge alone does not indicate learning when applied to health and does not result in behavior change. He suggests:

Health professionals should view education as a social process with learning occurring primarily as a result of human interaction which is based on self-knowledge and self-understanding. Education for health to be effective must operate on an individual at a personal level and in a social context. (Rosenstock, 1970)

A study by Sackett (1975) supports this theory. Two hundred thirty Canadians were put in random groups. One-half of each group were given hypertension follow-up at work while the other one-half continued to see their family doctor on their own time at personal expense. Also, one-half of each group were given a hypertension educational program at work. Neither convenience of treatment nor the educational program increased medication compliance. Sackett concluded,

This trial confirms that health knowledge is insufficient by itself to alter behavior. More behaviorally oriented strategies are suggested, such as: 1) home blood pressure monitoring; 2) charting of home blood pressure and medicine; and 3) tailoring regimens to daily rituals. (Sackett et al., 1975, pp. 1205-1207)

Studying "Cultural Differences in Concepts of Disease and How These Effect Health Behavior," Jenkins (1970) stated,

There must be a reward involved in health behavior for it to be continued. The action must result in pleasure and social approval. The subject must experience a feeling of reduced tension and enhanced self-esteem. (Jenkins, 1970, pp. 9-18)

Zifferblatt (1974) made the following recommendations for the self-management of patients on hypertension medication:

The patient must become an observer of self. He should keep a medication behavior record, observing antecedents and consequences of self medication. The goal is to identify routine and powerful cues already existing in one's environment and harnessing them to taking medication. (Zifferblatt, 1974, p. 85)

Considering these findings, it seemed appropriate to conduct a study of compliance behavior patterns of compliant and noncompliant patients. The information gained could be of significant clinical use in counseling patients experiencing compliance problems as well as newly diagnosed patients.

Study Questions

- 1) Can compliance of hypertensive patients to medical regimen be determined with self-report and records of blood pressure?
- 2) Is there a significant difference in knowledge of disease and medical regimen between compliant and noncompliant patients?
- 3) Is there a significant difference in behavior modification patterns found between compliant and noncompliant patients?
- 4) Does a relationship exist between behavior modification techniques and compliance with medical regimen?

Definition of Terms

- 1) Compliance. Conformity by the patient to the prescribed medical regimen was measured by:
 - a) Self report of the patient taking medication daily as prescribed
 - b) Blood pressure readings maintained at or below 150 mmHg systolic and 90 mmHg diastolic

- 2) Therapeutic Medical Regimen for Hypertension Control.
A combination of medical recommendations including:
 - a) Thiazide diuretic daily as prescribed
 - b) Weight control within 15 lb. body ideal
 - c) Dietary salt restriction
 - d) Abstinence from smoking
 - e) Abstinence from alcohol
 - f) Reduce stress factors in environment, if possible

- 3) Hypertension. An arterial pressure exceeding 150 systolic and 90 diastolic (resulting from essential hypertension) recorded with the patient in a sitting position experiencing no known undue stress.

4) Behavior Modification Techniques and Patterns.

- a) Acquisition of knowledge concerning hypertension
- b) Recording self-medication or measures taken to effect compliance
- c) Changes in life style to avoid risk factors

Limitations

Variables which were not controlled, but may have had an influence on the results:

- 1) Race, religion, or cultural background of patients
- 2) Employment, family, or social situation of individuals
- 3) Data collection in a limited geographic area
- 4) Study conducted by one investigator with limited access to patients and minimal time and funding
- 5) Patients agreeing to participate in the study may have tended to have a higher degree of compliance
- 6) The self-reports of the patients probably reflected an over-estimation of compliance behavior (Marston, 1970).

Delimitations

Variables which influenced results and were controlled were as follows:

- 1) The study included only English speaking, literate adults over twenty-one years of age.
- 2) Diagnosis of essential hypertension.
- 3) Patients chosen were limited to those whose medical regimen included control with thiazide diuretics, weight control, dietary salt restriction, and abstinence from smoking and alcohol.
- 4) Patients were under the care of a private physician of their choice.
- 5) All patients were responsible for the expense of their medical regimen. (Some did have Medicare or private insurance which reimbursed a portion of the costs.)
- 6) All patients were to have been diagnosed and under treatment for a minimum of three years.

Assumptions

It was assumed that:

- 1) Participants would answer honestly.
- 2) An adequate determination of compliance could be measured by studying recorded weights and blood pressure readings during physician office visits and by self-reporting of patients concerning medication, salt restriction, smoking, and alcohol use.
- 3) Behavior modification patterns could be identified.
- 4) Factors could be identified which positively influenced long term compliance with hypertension control.
- 5) Compliance with medical regimen was desirable and would result in increased longevity and improved quality of life for the hypertensive patient (V.A. Cooperative Study, 1970) .

Theoretical Framework

Hypertension is a normal reaction of the body in time of physical exertion to provide for increased cardiac output and increased oxygenation of vital body tissue. It is a basic physiologic adaptive response to physical stress.

However, in essential hypertension these responsive increases remain constant in the resting state, and in fact become a cause of stress by decreasing circulation to vital organs and increasing the workload of the heart. Decreased circulation results in tissue damage in the body and increased stress for the entire system. Selye (1976) refers to hypertension as a "disease of adaptation." He describes stress as follows:

Stress is essentially the rate of wear and tear in the body. It is the non-specific response of the body to any demand. The body's adaptive reaction is described in three stages as the 'stress syndrome.' It involves: 1) The alarm reaction - the immediate action upon recognition of the stressor; 2) Stage of resistance - physiologic and psychologic defense against the involving stressor; and 3) Stage of exhaustion - the inability to respond effectively, complete loss of resistance. (Selye, 1976, p. 1)

The stress syndrome is characterized by:

Adrenal stimulation, shrinkage of lymphatic organs, gastrointestinal ulcers, loss of body weight, and alterations in the chemical composition of the body. (Selye 1976, pp. 22-25)

The response to stress involves effect of the stressor, internal response and inhibiting response. Resistance and adaptation depend on a proper balance of these factors. Basically, the body has only two ways to defend against stress: advance against the aggressor or retreat (Selye, 1976, p. 114).

Essential hypertension experienced by patients today is a combination of response to psychological, physical, and possibly altered chemical composition of the body. No single causative agent has been discovered. However, control of hypertension is an adaptive response itself. The patient must recognize the stressor (the diagnosis) and choose to defend himself with medical control or deny it and suffer the resulting tissue damage and complications.

Summary

Many past studies have attested to the problem of noncompliance of patients with hypertensive medical regimen. This study was conducted in the office of a private physician in an effort to identify patients experiencing this problem, to assess patient knowledge, and to try to identify patterns of behavior change that are consistent with compliance. Each patient was counseled and aids to behavior changes such as medication recording, behavior records, and enlisting the aid of family or friends were suggested to increase compliance. The study was intended to be of benefit to both the patients participating in the study and the health professionals treating them in identifying more effective means of attaining hypertension control.

CHAPTER II

REVIEW OF LITERATURE

Hypertension is a disease with many unsolved problems. Its etiology is unknown, its diagnosis is a matter of meeting current criteria, and its treatment is a many faceted regimen involving the total lifestyle of the patient. For these reasons, the review of literature included purposed mechanisms of etiology, current medical management, and environmental risk factors. Patient compliance with medical regimen is the subject of primary concern, but all of these other factors are pertinent and vital to an understanding of the total problem of hypertension control. Also included is the nurse's role in combating this major health problem.

Pathophysiology of Hypertension

Hypertension refers to the physiologic state of having elevated arterial pressure, either systolic, or diastolic, or both. Diastolic elevation has been longer demonstrated to be associated with increased morbidity and mortality. Recently, it has been shown that systolic pressure is related to myocardial oxygen requirement and is as closely

related to cardiac hypertrophy as diastolic pressure increases (Tarazi and Gifford, 1975).

Blood pressure is differentiated in several ways which are:

I. Classification

A. Systolic Hypertension

1. Caused by increased stroke output of the left ventricle
2. Caused by increased rigidity of the aorta
3. Caused by coarctation or atherosclerosis of the aorta

B. Arterial hypertension (increase in both diastolic and systolic pressure)

1. Essential hypertension
2. Renal hypertension
3. Endocrine hypertension
4. Neurogenic hypertension
5. Toxemia of pregnancy

II. Degree

- ### A. Malignant hypertension is characterized by neuroretinopathy and rapid decline in renal function. Its pathology is fibrinoid arteriolar necrosis. The muscle fibers of the small arteries and arterioles rupture allowing plasma

and sometimes cells to invade the vessel wall. Consequently, stenosis and blockage of the lumen result. This condition can be accompanied by an inflammatory reaction involving all layers of the vessel wall (Laragh, 1974, p. 17).

When uncontrolled, this disorder leads to certain death as there is kidney, pancreatic, adrenal, brain, heart, and liver damage.

Renal failure, cerebral hemorrhage, and left cardiac ventricle failure are the most common causes of death (Laragh, 1974, p. 17).

- B. Benign hypertension is characterized by atheroma and Charcot-Bouchard aneurysms. Retinopathy is essentially absent or minimal. The pathology of this condition involves nodular arteriosclerosis of the intima of the larger arteries. Fibrous and fibrofatty plaques are found on the inner vessel walls and thrombi may form causing ischemia or infarction of the surrounding tissue. Angina pectoris, myocardial infarction, cerebral vascular accident, and renal artery disease are the most common long term, slowly developing complications (Laragh, 1974, p. 11).

Charcot-Bouchard aneurysm refers to the ballooning effect due to atheroma of the small arteries (less than one mm. in diameter) in the basal ganglia and subcortical region of the brain. The presence of these defects are associated with increased incidence of cerebral hemorrhage (Laragh, 1974, pp. 13-17).

The course of benign hypertension is gradual with increasing change of cardiovascular or cerebral damage as the disease progresses. The higher the pressure and the more severe the atherosclerosis, the more frequent the occurrence of cerebral or cardiac disease (Laragh, 1974, p. 12).

III. Cause (Etiology)

- A. Secondary Hypertension - that for which a cause is known.
- B. Essential Hypertension - that for which a cause can not be identified.

The following chart relates the known causes of secondary hypertension:

Types of Hypertension

- I. Systolic hypertension
 - A. Increased cardiac output
 - 1. Aortic valvular insufficiency
 - 2. A-V fistula, patent ductus
 - 3. Thyrotoxicosis
 - 4. Paget's disease of bone
 - 5. Beriberi
 - 6. Hyperkinetic circulation
 - B. Rigidity of aorta
- II. Systolic and diastolic hypertension
 - A. Primary, essential, or idiopathic
 - B. Secondary
 - 1. Renal
 - a. Renal parenchymal disease
 - 1) Acute glomerulonephritis
 - 2) Chronic nephritis: glomerulo-, pyelo-, interstitial, hereditary, irradiation
 - 3) Polycystic disease
 - 4) Connective tissue diseases
 - 5) Renin-producing tumors
 - 6) Hydronephrosis
 - b. Renovascular
 - c. Renoprival
 - d. Primary sodium retention (Liddle's syndrome, Gordon's syndrome)
 - 2. Endocrine
 - a. Acromegaly
 - b. Hypothyroidism
 - c. Adrenal
 - 1) Cortical
 - (a) Cushing's syndrome
 - (b) Primary aldosteronism
 - (c) Congenital adrenal hyperplasia
 - 2) Medullary pheochromocytoma
 - d. Hypercalcemia
 - e. Exogenous
 - 1) Estrogen
 - 2) Glucocorticoids
 - 3) Mineralocorticoids: licorice, carbenexolone
 - 4) Sympathomimetics
 - 5) Tyramine-containing foods and MAO inhibitors

3. Coarctation of the aorta
4. Toxemia of pregnancy
5. Neurogenic
 - a. Psychogenic
 - b. Increased intracranial pressure
 - 1) Respiratory acidosis (CO₂ retention):
lung or CNS disease (polio)
 - 2) Encephalitis
 - 3) Brain tumor
 - c. Lead poisoning
 - d. Familial dysautonomia
 - e. Acute porphyria
 - f. Quadriplegia
6. Miscellaneous
 - a. Polycythemia
 - b. Increased intravascular volume
 - c. Burns
 - d. Carcinoid syndrome

(Kaplan, 1978, p. 20)

This chart demonstrates the results of three studies relating the incidence of the different causes of hypertension. (Figure 1)

Figure 1

Percentage of Frequency of Various Diagnoses in Hypertensive Subjects

Diagnoses	Gifford	Ferguson	Berglund
Essential hypertension	89.0%	90.0%	94.0%
Chronic renal disease	5.0%	2.0%	4.0%
Renovascular disease	4.0%	3.0%	1.0%
Coarctation	1.0%	0.0%	0.1%
Primary aldosteronism	0.5%	0.4%	0.1%
Cushing's syndrome	0.2%	0.0%	0.0%
Pheochromocytoma	0.2%	0.0%	0.0%
Oral contraceptive induced		4.0%	(men only)
Number of patients	4,939.0	246.0	689.0

(From Gifford, RW, Jr., Milbank Mem Fund Q 47:170, 1969; Ferguson, RK Ann Intern Med 82:761, 1975; Berglund, G., Andersson O. Wilhelmsen L. Br Med J 2:554, 1976.)

Clearly, essential hypertension is the most common manifestation. This type of disease is characterized by elevated arterial pressure, usually both systolic and diastolic, and exhibits a state of increased peripheral vascular constriction of unknown etiology. Even the pathophysiology of this disease is difficult to describe as the condition does not seem to be uniform in all patients.

Essential hypertension is most often described as a pattern of initial high cardiac output which returns to normal while peripheral resistance becomes elevated and the arterial elevation remains as a constant finding. Normal physiologic response to increased cardiac output is to dilate vessels. However, in a hypertensive person, the kidney responds to the increased plasma volume by constricting vessels to increase sodium and water output and even after cardiac output returns to normal the peripheral resistance remains high (Kaplan and Lieberman, 1978, p. 45).

The idea that hypertensive disease is a systemic disorder rather than simply a hemodynamic alteration is supported by findings of studies which demonstrate a change in the electrolyte and water content of skeletal muscle, brain, and liver tissue. There is an increase in their sodium and decrease in potassium content. Blood vessels also reflect this change and extracellular fluid volume is expanded in chronic hypertension. (Sambhi, 1973, p. 5)

Arterial pressure in the body is determined by the action of the autonomic nervous system and the renin-angiotensin-aldosterone system on the heart, the kidneys, and the vessels themselves. This action controls the rate and force of the heart and the degree of vascular constriction. The level of blood pressure is dependent primarily on the amount of blood (plasma volume) pumped by the heart (cardiac output) and the resistance of the vascular bed (peripheral resistance.) Viscosity of the blood and elasticity of the aorta also effect the pressures (Nies, 1977, p. 675).

The sympathetic nervous system produces norepinephrine which works directly on the vessels causing constriction. The renin-angiotensin system also causes vessel constriction indirectly. Renin is an enzyme produced in the juxtaglomerular cells in the kidney. Once in the circulation, renin combines with other substances to form angiotensin I. Enzymes in the lung combine with the angiotensin I to form angiotensin II, a potent vasoconstrictor. The angiotensin II also stimulates the adrenal cortex to release aldosterone which results in the kidneys retaining salt and water. Renin production in the body can be stimulated by a decrease in renal perfusion, an alteration in the sodium concentration of the distal nephron, and through sympathetic nerve

stimulation to support blood pressure. However, in hypertension, renin production can have a feedback destructive effect. Renal function can be deteriorating due to the effects of hypertensive atherosclerotic disease, and yet the kidney will continue to produce renin to increase perfusion which leads to further deterioration (Nies, 1977, pp. 676-678).

Hypertension then is a disease whereby the body has lost its ability to regulate itself. Three factors seem to play a major role in perpetuating this state:

1. Change of vessel noted as an increase in arteriole wall thickness and increased sensitivity of the smooth muscle.
2. The decreased response of baroreceptor reflex in the carotid sinus resets adapting to higher pressure and tolerates vascular constriction without response.
3. The vulnerability of the renal vessels under increased pressure leads to arteriolar nephrosclerosis.
(Tarazi and Gifford, 1975, p. 192)

Hemodynamically, essential hypertension is associated with normal cardiac output and increased peripheral resistance. The elevated vascular constriction is fairly uniform throughout the body and found to be slightly more pronounced in the kidney and somewhat less so in the skeletal muscle.

Two mechanisms causing vascular constriction have been proposed: 1) A primary increase in cardiac function, and 2) A primary increase in blood volume caused by renal retention of sodium. (Kaplan and Lieberman, 1978, p. 46)

Plasma volume in hypertensive patients can be decreased, normal, or increased. In essential hypertension plasma volume is usually normal or low. However, some studies have suggested that while blood volume is normal, the distribution may be altered in that more blood is in the cardiopulmonary component due to the increased peripheral resistance. A small percentage of essential hypertension patients do have increased volume usually accompanied by altered sodium exchange and increased extracellular fluid volume.

In benign hypertension renin levels and aldosterone secretion are usually within normal limits. In malignant hypertension, however, these secretions show marked increases.

Certainly the kidney does play a part in the chronic hypertensive state. When arterial pressure is raised, a normal kidney excretes more salt and water in the process of pressure natriuresis. In the hypertensive person the increased pressure within the renal afferent arterioles and arterial vasoconstriction increases flow through the glomerulus and increased sodium reabsorption occurs. The result

is a resetting of the pressure control mechanism of the renal absorption and excretion system of the body (Kaplan and Lieberman, 1978, pp. 48-50) .

Other factors which have been suggested, but not proven, include:

- 1) Increased sympathetic nervous system activity
- 2) Increased sensitivity to renin or angiotensin
- 3) Decreased activity of vasodepressor system
- 4) Psychogenic sympathetic stimulation
- 5) Heredity
- 6) Excessive salt intake
- 7) Increased vascular activity

(Kaplan and Lieberman, 1978, pp. 45-63)

In summary, essential hypertension is a multi-faceted phenomenon. No single cause can be uniformly demonstrated, but there can be found common manifestations of physiologic symptomatology. Therapy must approach each patient with his unique symptoms and physical condition on an individual basis in order to be effective.

Epidemiology of Hypertension

Epidemiological studies have been important in the study of essential hypertension to identify the risk factors involved and to demonstrate the relationship between uncontrolled hypertension and increase in morbidity and mortality to its victims. Studies have dealt with the association of age, sex, race, family history, diet, economic status, weight, and personality traits. Studies have focused on entire isolated populations and diverse samplings of large populations.

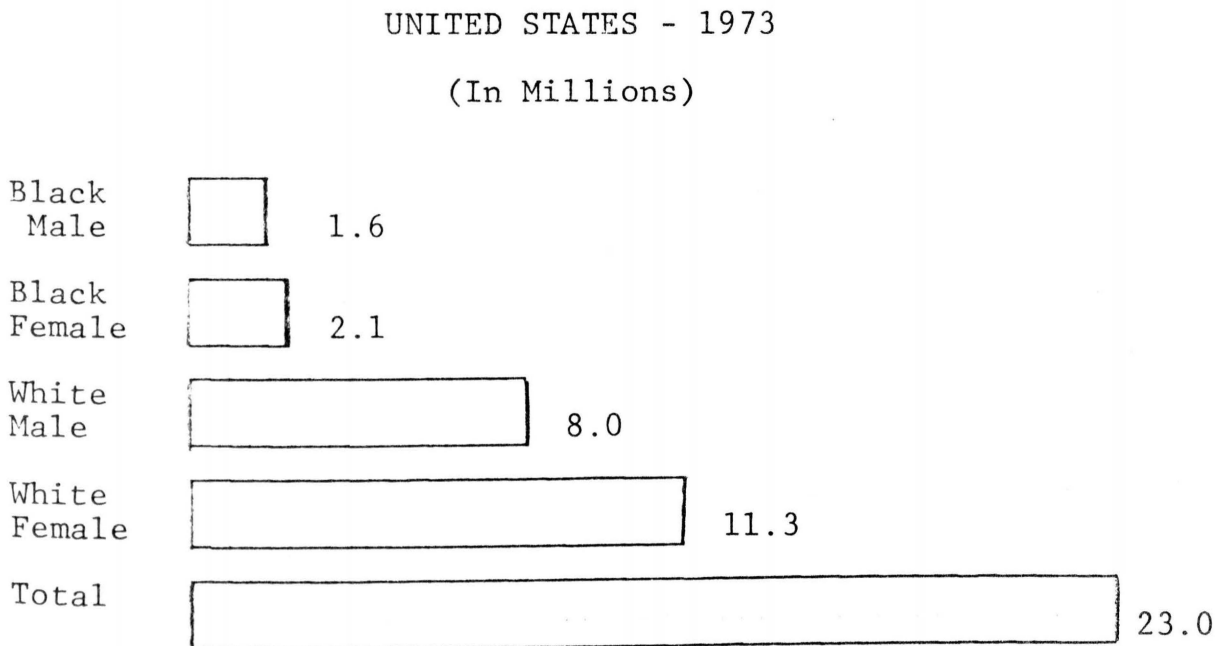
No single factor has been identified as causing essential hypertension, but many facets of heredity, environment, and life-style appear to be significant in its development and course.

First, there must be a definition of hypertension. The World Health Organization has recommended the following criteria for studies:

- 1) Below 140 mmHg systolic and below 90 mmHg diastolic--normal range
 - 2) Above 160 mmHg systolic and above 95 mmHg diastolic--hypertensive range
 - 3) The intermediate group - borderline hypertension
- (Smith, W.H., 1977, p. 468)

The National Health Education Committee (1976) estimates between 23 to 25 million Americans are hypertensive using these criteria. Approximately 20 million of these Americans are white and 4 million are black (Smith, W.M., 1977, p. 471). (Figure 2)

FIGURE 2



PERCENT OF POPULATION
AGES 18 TO 79 WITH HIGH BLOOD PRESSURE

What is the significance of these numbers? The Framingham study identified hypertensive persons as having a five times a higher rate of cerebrovascular accident than normotensive persons (Smith, W.M., 1977, p. 475). In addition the Pooling Project demonstrated that when hypertension exists alone, the death rate from coronary heart disease doubles. When hypertension exists with one other risk factor such as cigarette smoking or hypercholesterolemia, the risk of dying triples, and if all three factors are present, the morbidity rate becomes five times higher (Stamler et al., 1974, p. 6). In fact, the risk of every manifestation of coronary heart disease has been shown to be related to the antecedent level of both systolic and diastolic blood pressure (The National Health Education Committee, 1976, p. 146).

In the United States hypertensive disease and heart disease are significantly more prevalent among blacks. The incidence of death from these causes before age fifty is six to seven times higher and two and one half times higher after age fifty in the black population in comparison to the white race. Heredity, salt ingestion in the diet, and social stress have all been associated with this racial phenomenon though no argument is conclusive (Paul, 1977, p. 617).

Death is not the only problem. Disability resulting from coronary and cerebral vascular disease is a major medical and economic burden. The complications of hypertension can be severe whether fatal or chronic. It is estimated by the National Health Institute that the economic cost of hypertensive diseases is \$2,655,000,000 per year in the United States alone (The National Health Education Committee, 1976, p. 143).

As dismal as these facts may appear, the positive results of effective treatment are statistically encouraging. The Veterans Administration Cooperative study reported:

Treatment of high blood pressure was 67 percent effective in reducing the incidence of heart failure, strokes, and other cardiovascular complications. Also, the National Vital Statistics Division (1973) states 'the death rate from hypertensive disease has declined more than 65 percent since 1950 due to improved treatment.' (The National Health Education Committee, 1976, p. 140)

Sex and age have a statistical relation to incidence of hypertension. While more women have hypertension in total overall numbers, before age fifty-five the percentage rate is higher for the male population. After age fifty-five, the percentage of incidence is higher for women. Incidence of hypertension in women has also been found to be more frequent following menopause (Genest et al., 1977, p. 616).

Age is one of the etiologic factors often studied and still debated. The 1962 National Health Examination Survey revealed the population to have a slight mean systolic rise from early to middle life and then a more rapid systolic rise after age forty. The mean diastolic pressure was reported to show a small but steady rise through age sixty.

Pickering's theory (Stamler, 1967) interprets this rise in pressure to show "a biologic continuum of blood pressure, which varies upward with age." (Stamler, 1967, p. 60)

Platt feels only a select portion of the population that has an inherited condition experiences this age-associated rise in blood pressure (Platt, 1963, p. 899). Long term studies of Welsh coal miners and World War II aviation cadets found rise in pressure more in relation to early higher levels than simply age. The conclusion of these studies point to a group of the population which has an elevated pressure early in life which continues to rise with age (Smith, W.M., 1977, p. 472).

In a review of epidemiologic studies Stamler (1974) found that family history of hypertension could be used as a predictor of tendency to develop this disease. It was also reported that if both parents suffered essential hypertension, the risk factor for progeny was greatly enhanced (Stamler, 1974, p. 11).

Risk factors such as salt ingestion, cigarette smoking, and obesity have been studied at length to describe their possible part in the aggravation of this tendency into the actual disease state.

In laboratory animals hypertension can be produced by sodium loading. In humans the evidence remains less direct. Hypertension can definitely be reduced by eliminating salt from the diet, and societies with increased sodium ingestion usually reflect increased incidence of hypertension (Smith, W.M., 1977, p. 480).

Obesity is associated with increased incidence of hypertension, and change in weight is associated with change in blood pressure. However, there are very obese individuals with normotensive blood pressure. This again indicates the multi-faceted aspect of this disease. It may be only those persons with an inherited tendency to hypertension that develop the disease when stressed by weight. The Framingham study reported that

. . . high blood pressure developed approximately ten times more often in individuals 20 percent or more overweight than in those more nearly at ideal weight. (Genest, et al. 1977, p. 621)

Cigarette smoking has been repeatedly associated with coronary artery disease but cannot be related to the etiology

of hypertension. Some studies have even shown cigarette smokers to have lower blood pressure, but these results may be attributed to weight differences. Regardless, when cigarette smoking is added as a stress factor to a person with a hypertensive diagnosis, the risk of coronary heart disease is greatly increased (Kannel and Sorlie, 1975, p. 553).

In summary, hypertension is a dangerous chronic disease affecting a large segment of the population. While its cause is unknown, genetic and environmental factors have a significant influence on its incidence and severity. Treatment has been shown to be successful and worthwhile. In view of this knowledge, progress to diagnose, treat, and encourage patient compliance is of vital importance.

Medical Management of Hypertension

Successful medical management of hypertension involves several steps. Initially, the most important step is a complete medical history and physical examination to correctly establish the diagnosis, to identify secondary problems such as diabetes or hyperlipoproteinemia, to reveal complicating factors such as coronary artery disease or decreased renal function, and to become aware of individual patient situations such as severe emotional and mental stress. The decision to

treat hypertension is usually made when diastolic readings are consistently elevated above 96 mmHg. Treatment of elevated systolic arterial pressure alone or labile hypertension has not been proven to increase survival or reduce cardiovascular complications. However, in the case of threatening factors such as family history of cardiovascular deaths or the presence of atherosclerotic disease, treatment of borderline hypertension may be elected (Gifford, 1974, pp. 83-85).

Drug Therapy

In most programs today drug therapy is usually considered the most important and reliable facet of treatment. Medication regimen is usually done in a step fashion using the least number and smallest dosage of drugs that will yield the desired effect. Increasing type and number of drugs enhances the event of side effects which can be both unpleasant and possibly harmful. Three classes of drugs are considered for treatment of hypertension: diuretics, direct vasodilators, and sympathetic inhibitors (Wollam and Gifford, 1978, pp. 25-30).

Diuretics

Diuretics are the least powerful and most commonly used drug for mild essential hypertension. They will be

discussed in more depth than others inasmuch as all the patients in this study were treated with thiazide diuretics.

The action of diuretics and thiazides specifically is to reduce blood pressure by depleting the body of excess salt and water. These drugs reduce the arterial pressure by lowering total peripheral resistance. Although the mechanism is not clearly understood, these drugs may dilate vessels by direct action on the arteriolar smooth muscle or change the electrolyte concentration in the arteriolar wall which alters the thickness, tone, and pressor responsiveness of the vessel wall. Cardiac output and heart rate usually remain unchanged; however, some patients show slight increases of these responses. Diuretics usually reduce arterial pressure by 15 mmHg or less and suffice only in mild essential hypertension. Plasma renin activity is usually noted to be increased in essential hypertension (Laragh, 1974, pp. 760-761). However, Distler and Wolff (1973) report low plasma renin in 20 to 30 percent of essential hypertension patients which they propose may result from a primary defect in renin secretion, a sodium excess with volume expansion, or an abnormal renin aldosterone pattern (Distler and Wolff, 1973, p.123).

Thiazides prevent reabsorption of sodium and chloride in the distal segment. In some cases they evoke potassium

secretion in an amount sufficient to produce hypokalemia. Inhibition of carbonic anhydrase is found to vary readily. Glomerular filtration rate may be reduced. Uric acid excretion is decreased, and the concentration in plasma is increased. Renal excretion of calcium magnesium iodide and bromide are increased, and extracellular fluid shows a slight increase.

Thiazides are readily absorbed from the gastrointestinal tract but have been given intravenously for experimental purposes. Physiological response is noted to be rapid with measurable effects within an hour. The medication does not accumulate in any tissue other than the kidney, although renal clearance is rapid and most compounds are excreted in three to six hours.

Possible toxic effects include potassium depletion, possible aggravation of renal or hepatic insufficiency, and hyperglycemia possibly being precipitated in patients with diabetes mellitus (Goodman and Gilman, 1975, pp. 830-832). The most commonly used diuretics are the sulfonamide derivatives, chlorothiazide (Diuril) and hydrochlorothiazide (Hydrodiuril, Esidrix, and Oretic). When these medications are ineffective, the more potent furosemide (Lasix) and ethacrynic acid (Edecrin) may be employed. If potassium depletion or hyperglycemia becomes

a problem, the distal tubular diuretics spironolactone (Aldactone) or triamterene (Dyrenium) may be employed (Rodman, 1979, p. 112). Metolazone (Zaroxolyn) a new diuretic, which interferes with renal tubular electrolyte reabsorption, comes in a long acting tablet and is useful with patients who have trouble remembering to take medicine more than once a day.

Sympathetic Inhibiting Agents

The usual secondary step when diuretics alone are ineffective is to add or substitute an agent which blocks sympathetic activity. In the past, rauwolfia compounds such as reserpine (Serpasil) were utilized. However, the side effects of these compounds included depression, lethargy, and drowsiness (Gifford, 1974, p. 93). Recently, methyldopel (Aldomet) and clonidine (Catapres) have been used more frequently. These drugs act both on the central nervous system and on peripheral nerve endings to decrease transmission of the impulses that constrict arterioles and increase cardiac activity (Rodman, 1979, p. 715). There has been an innovating approach of the use of beta blocking agents as the single drug of choice in antihypertensive therapy. Drugs such as propranolol (Inderal) and metoprolol are being employed as the initial, primary source of therapy

(Hansson and Werkl, 1977, p. 394). Beta adrenergic receptors in the heart tissue are blocked so they do not receive stimulation. The heart rate and cardiac output are reduced, nerve impulses to the blood vessels are reduced, and the kidneys release of renin is reduced. These drugs are of particular benefit to patients with high plasma renin (Hallifield, 1976, p. 68).

Among the most potent antihypertensive agents available are the ganglion blocking drugs. These drugs compete with acetylcholine (ACh) at the synapse of autonomic ganglia and reduce both sympathetic and parasympathetic response. So, in addition to vessel dilation, there is a loss of body temperature, reduction in cardiac output, and a multitude of side effects such as dry mouth, blurred vision, and reduced gastrointestinal action. For these reasons drugs such as pentolinium (Ansolyson) are used only in emergencies and with patients that resist other treatment (Bergerson, 1976, pp. 180-181).

Guanethidine is a selective inhibitor which blocks norepinephrine at the sympathetic receptor only. This medication reduces blood pressure and heart rate and should not be used in patients with coronary insufficiency renal disease, or cerebrovascular disease. When used, guanethidine works best in combination with a diuretic and is one of

the best drugs employed in resistant hypertension (Wollam and Gifford, 1978, p. 27).

Prozosen (Meniprese), a new alpha-adrenergic blocking agent, is also being tried with patients having angina pectoris, inasmuch as it does not decrease heart rate as much as other drugs. Prozosen can cause postural hypertension (Kaplan and Lieberman, 1978, p. 41).

Vasodilators

Several drugs used in hypertension therapy directly affect the smooth muscle of the vessel causing vasodilatation. Hydrolazine (Apresoline) is the only medication which can be administered orally. Diazoxide (Nyerstat) and sodium nitroprusside (Nipride) must be used intravenously. However, these agents have several severe side effects including tachycardia and increased cardiac output which must be concurrently treated with other drugs, so their use is usually limited to severe hypertension and hypertensive crises (Bergersen, 1976, pp. 178-180).

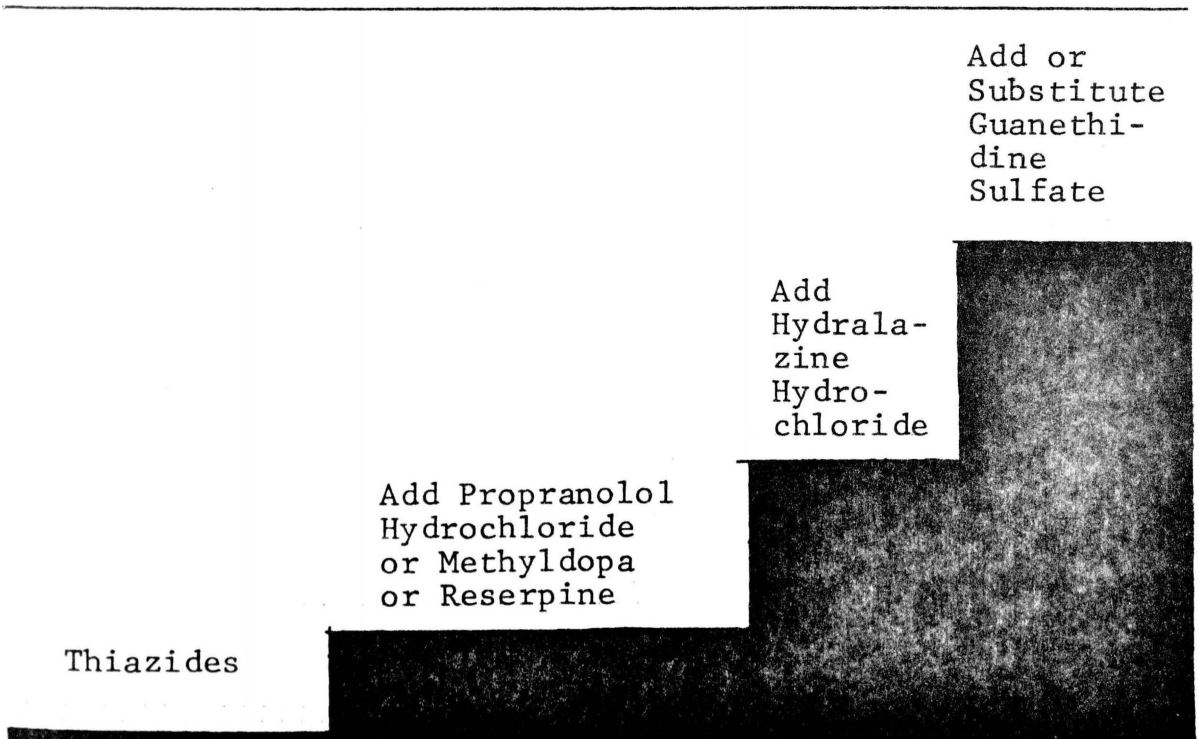
Menoxidil is a new vasodilator antihypertensive drug under investigation which can be given orally. However, like the others, this drug's use is reserved for patients resistant to simpler therapy. Body fluid retention and activation of the sympathetic reflex are problems, so

Menoxidil is normally given in combination therapy with a sympathetic inhibiting agent and a diuretic (Nies, 1977, pp. 690-691).

The following models are examples of the step type approach recommended for current medical drug therapy.

Figure 3

Recommended Antihypertensive Regimens



(Kaplan and Lieberman, 1978, p. 39)

FIGURE 4. STEPS IN THE MEDICAL TREATMENT OF HYPERTENSION

STEP 1: ORAL DIURETIC

Usually thiazide or related diuretic;
use furosemide if azotemia present

STEP 2: ADD A SYMPATHETIC DEPRESSANT

Propranolol	OR	Methyldopa
40 mg twice a day		250 mg twice a day
120 mg 4 times a day		500 mg 4 times a day

OR	Clonidine	OR	Reserpine
	0.2 mg every day		0.25 mg every day
	0.6 mg 4 times a day		

STEP 3: ADD A VASODILATOR

Hydralazine	OR	Prazosin*
25 mg twice a day		2 mg twice a day
75 mg 4 times a day		20 mg twice a day

STEP 4: ADD A MORE POTENT SYMPATHETIC DEPRESSANT**

Guanethidine
10 to 100 mg or more every day

*It may be possible to use prazosin as an alternative in Step 2 instead of one of the sympathetic depressant drugs.

**When propranolol is used in Step 2, there may be merit in using phenoxybenzamine (10 to 20 mg 4 times a day)

Side Effects of Antihypertensive Drugs

No discussion of antihypertensive drug therapy is complete without inclusion of the role that side effects play in treatment and in patient compliance. It is of utmost importance that patients be made aware of the unpleasant and in some cases potentially dangerous side effects of antihypertensive medications.

Simple diuretic therapy is usually accompanied by initial fatigue, frequency of urination, and dry mouth. Of more importance is the careful monitoring of patients for metabolic disorders with hypokalemia, often necessitating potassium supplementation. Hyperglycemia, hyperuricemia, and hypercalcemia must be considered potentially hazardous and monitored for a time. Potassium sparing diuretics can result in hyperkalemia and hyponatremia (Maloney, 1978, pp. 27-29).

All patients on antihypertensive therapy must be monitored carefully to avoid overdosage and resulting hypotension. Patients must be instructed to report vertigo and syncope immediately.

Impotence is associated with some drugs, including reserpine, methyldopa, and chlorzidine. This is often a reason for therapy being discontinued. Patients must be

effectively counseled concerning this problem, and alternate types of therapy employed when it is of critical importance to the individual. Failure of the male to be able to ejaculate is the most common problem causing severe personal life-style upset. Since patients are often uncomfortable admitting or discussing sexual complaints, the therapist must solicit information to be able to deal with the problem. The assessment must also include other life-style habits affecting sexuality, including sleeping and rest, drug and alcohol use, general health, and marital or social stress. Taking all these variables into account, the medical regimen can be adjusted and the patient continued in some form of treatment (Kaplan, 1979, pp. 80-89).

Depression and slowing of mental process are other problems of primary concern. Rauwolfa compounds are seldom used today because of these effects. Reserpine, methyldopa and propranolol also are associated in some patients with these occurrences. A study by Brant (1978) did not find hypertensive patients any more depressed than other patients with chronic illnesses. However, patients treated with diet alone were notably less severely depressed than drug-treated patients (Brant, 1978, p. 280). So the possibility must be considered, and alternate therapy used when the problem exists.

Monoamine oxidase inhibitors have antihypertensive effect but are too dangerous to use because of drug and food interactions which can result in release of catecholamines. Any substance containing tyromine is contraindicated in use with these drugs, and fatal interactions with narcotics, antidepressants, and antihistamines are possible (Nies, 1977, p. 685).

In summary, all diuretics and antihypertensive drugs in use today have both some noticeable side effects and possibly untoward results. Educating, monitoring, and treating the patients concerning these problems is a vital part of therapy to obtain medication compliance and blood pressure control.

Weight Control

Excess weight is commonly accepted as being associated with increased blood pressure. However, no cause-effect relationship has been proven to date. Hypertension does not develop in every obese person nor does all weight gain result in increased blood pressure. There is an increased tendency, however, for hypertension in the obese. Other factors such as sodium metabolism, life style, stress, and activity play a role (Moser 1975, pp. 31-34).

The statistics from many studies reveal an increased incidence of hypertension among persons who are over ideal body weight (Laragh, 1974, p. 56). Correlating data support these findings.

In 1969, Chiang reviewed a group of studies concerned with overweight and incidence of hypertension. He found hypertension more common in obese persons than non-obese persons. Weight reduction was shown to lower blood pressure. He stated that despite the lack of understanding of the mechanism of stress created

. . . the adverse metabolic and hemodynamic effects of obesity upon hypertension impose an extra burden and stress on the circulatory system and compromise functional adequacy. (Chiang, et al., 1969, p. 403)

A 1974 study reported on the sevenfold increase in sucrose consumption in Western populations of the world during the nineteenth century which has had an effect on obesity in their populations. Obesity has increased, and the incidence of hypertension, in turn, has been implicated as a causative factor in disturbed glucose regulation resulting in the development of increased occurrence of atherosclerotic heart disease (Ahrens, 1974, pp. 403-422).

Studying one hundred healthy men, Whyte (1959) reported that total body bulk was more important than fat. He found

a positive correlation between blood pressure and body weight when allowance was made for age, height, and fatness of arm. He also found an increase in body weight of twenty-eight pounds was associated with a 10 mmHg systolic and 7 mmHg diastolic pressure. In his discussion he proposed that cardiac output increases in response to increased bulk of tissue, but found the aorta and elastic arterial reservoir is unable to increase adequately accounting for the rise in blood pressure (Whyte, 1959, pp. 511-519).

An often quoted source is the Framingham study. The findings included the following:

Weight gain is accompanied by atherogenic alterations in blood lipids, blood pressure, uric acid, and carbohydrate tolerance. It is uncertain whether the nutrient composition of the excess calories derived largely from saturated calories accompanied by cholesterol and simple carbohydrates, or the positive energy balance per se, is important. Whatever the cause, development of ordinary exogenous obesity encountered in the general population is associated with excess development of coronary heart disease. (Ashley and Kamel, 1974, p. 103)

A seven year study of young adults in Georgia found weight in youth is associated with both initial blood pressure and a predictor of subsequent blood pressure. The findings support maintenance of ideal weight beginning in youth as a preventive measure in hypertension (Johnson, et al., 1973, pp. 329-340).

In a similar study in South Carolina, it was reported that weight/height indexes correlated poorly with coronary heart diseases. The highest correlations found were white males and young white females (Klein et al., 1973, pp. 329-340). Stamler, in 1974, also cited racial differences. "While obesity is not more frequent in black males, hypertension is. So whatever the role of diet, caloric balance is not a main causative factor." (Stamler, 1974, p. 23)

Stamler referred to a study by Dahl (1972) which reported when hypertensive obese people reduce their weight, blood pressure is not reduced unless they also reduce salt intake. Conversely, blood pressure can be reduced by decreasing salt intake while maintaining previous caloric intake (Dahl, 1972, pp. 231-344).

Dietary Sodium Ingestion

The relationship between human salt consumption and hypertension has been the subject of multiple research studies and the center of much debate for many years. Tobian (1975) reported on animal studies where experimental animals have been bred which are hypertension-prone or hypertension-resistant. The susceptible group developed hypertension on an increased salt diet while the resistant group did not (Tobian, 1975, pp. 45-68). In addition, he

reviewed several epidemiologic studies. Summarizing these, he stated:

In areas where the population has a very high salt intake, the incidence of hypertension is high. Where the salt intake is low, the incidence of hypertension is low, and blood pressure does not rise with advancing years. A salt intake as low as 46 mEq daily is compatible with very vigorous health. (Tobian, 1975, p. 49)

Historically, the rice diet introduced by Kemper in 1948 supports the theory of salt-induced hypertension. By placing human patients on a diet derived from rice and fruit containing two thousand calories, 5 gm fat, 20 gm protein, 200 mg of chloride, and 150 mg of sodium, he reported dramatic decrease in blood pressure, reduction in heart size, reversion of abnormal electrocardiogram, and disappearance of severe retinopathy (Kemper, 1948, pp. 545-577).

In response to these reports by Kemper, Dahl did extensive animal studies using rats. He determined a genetic tendency to be critical in the role salt plays in the development of hypertension. He stated a direct causal relation between those susceptible to hypertension and salt induced hypertension. He also reported on human patients who remained healthy on daily allowances of sodium between 4 to 8 m EQ/day for periods up to fifteen years. He found sodium in the diet was more a response

to custom than a need for survival. In fact, the only responses that were related to low salt diet were lowered blood pressure, weight reduction, and increased health. He also referred to several epidemiologic studies supporting the relation between excessive salt intake and development of hypertension (Dahl, 1972, pp. 231-243).

In agreement with these theories, Freis explains the possible physiological response of the body as follows:

Elevated blood pressure could result from circulatory adjustments that occur in response to an increase in extracellular volume. Venous filling pressure rises and is followed by an increase in cardiac output and a rise of blood pressure, as a result of the increased pressure, the kidney is able to excrete the increased volume. To explain the occurrence of hypertension in some individuals and not in others, he postulates on unknown renal defect requiring a higher than normal blood pressure to excrete the increased salt and water load. (Freis, 1976, p. 589)

Theories such as these also may help to explain why many patients with mild to moderate essential hypertension have no increase in renin, angiotensin, nor aldosterone levels. Stating these theories and quoting many of the epidemiological studies previously mentioned, Freis (1974) concluded that:

. . . reduction of salt in the diet to below 2 mEq day would result in the prevention of essential hypertension and its disappearance as a major public health problem. (Freis, 1976, p. 589)

A National Institute of Health study supported the theory of salt sensitive humans. Nineteen patients with known essential hypertension were placed on experimentally high and low sodium diets. All were tested and declared to have normal renal function. Nine patients were found to be salt sensitive. They consistently excreted less salt in the urine, had body weight gain and higher blood pressure readings than the non-sensitive group. It was also noted that the non-sensitive group had higher plasma levels of renin and aldosterone which may suggest an autonomic response as a mechanism in their hypertension (Kawasaki et al., 1978, pp. 198-198).

A recent Australian study revealed salt restriction in a group of patients was effective in reducing blood pressure regardless of sensitivity (Morgan et al., 1978, pp. 227-230). This report suggested lowering sodium intake to 70 MEQ/day before beginning drug therapy, as this alone may be sufficient to reduce readings to discrete levels. Duston et al., (1974) in theory agreed with the hypothesis of dietary sodium restriction, but stated that it is often impractical to maintain in many cultures. He supported combination therapy with diuretic drugs as being equally effective and much more realistic with long term treatment of essential hypertension. The hemodynamic effect

producing a negative salt and water balance is the same as severe dietary salt restriction and is equally successful in lowering arterial blood pressure (Duston et al., 1974, pp. 1007-1013).

Hill (1979) also stressed a flexible, realistic approach when counseling hypertensive patients about salt restriction. It is more important to inform patients what they can eat than to tell them what they should not eat. Suggest using frozen and fresh vegetables and meats rather than canned products. Learn to read labels on drugs and foods. Use garlic lemon and herbs for flavoring food. Encourage the use of salt substitutes. Educate patients as to the amount of sodium in average servings of food and in commercially packaged products (Hill, 1979, pp. 906-909). The Consumer Reports (March 1979, pp. 147-149) has a chart listing popular American commercial foods and their relative sodium content. Adapting the usual diet of the patient is more palatable than changing it altogether and more likely to be successful.

Cigarette Smoking

Cigarette smoking has never been identified as a cause of hypertension. Its main importance is that smoking is a potent risk factor in coronary atherosclerotic disease. Nicotine cigarette smoke has been shown to increase heart

rate, arterial pressure, and increase myocardial oxygen demand in persons with known coronary heart disease. It is believed that the nicotine acts on the chemoreceptors in the carotid and aortic bodies. After smoking patients experience a significant decrease in exercise performance (Aronow et al., 1974, pp. 330-332).

A retrospective autopsy study of women who suffered sudden death associated with coronary heart disease reported 62 percent were heavy smokers. It was noted that the number of women at risk has risen in the last ten years as the number of women smokers has increased. Also, the results revealed the mean age of death was nineteen years younger for smokers than non-smokers (Spain et al., 1973, p. 1005).

The Framingham study is the source of most current information concerning the relation of smoking to hypertension and heart disease. This study supported the findings that smoking does not cause hypertension, but is a major risk factor. Smoking in fact sometimes is associated with lower arterial pressures when body weight is also lower (Paul, 1975, pp. 553-590).

Alcohol Consumption

Alcohol consumption has never been proven to have a direct causal effect producing hypertension. However, several recent studies have indicated heavy drinking as a risk factor, particularly when it is combined with other factors such as obesity and cigarette smoking.

Ramsay (1979) in a review of studies concerning alcohol consumption and its effects reported systolic and diastolic blood pressure readings significantly higher for persons ingesting three or more alcoholic drinks daily than for non-drinkers or light drinkers. The pathophysiological mechanism is speculative, but he suggests the following:

Alcohol intoxication apparently increases plasma renin, aldosterone, and vasopressin concentrations. Chronic alcohol abuse is associated with elevation of plasma cortisol and with a reversible syndrome resembling Cushing's syndrome biochemically and clinically, the clinical features including hypertension. In animals, alcohol may produce functional and morphological changes in the kidney, may increase circulating catecholamines, and alters central catecholamine receptor sensitivity. (Ramsay, 1979, p. 30)

The Framingham study revealed light drinkers to have slightly lower pressures than non-drinkers. This possibly relates to the sedative effect of alcohol in moderate use (Paul, 1975, pp. 553-590).

A study of employees from the Chicago Gas Company and Western Electric Company found heavy alcohol intake associated with higher systolic and diastolic pressure and increased death rate in men (Genest et al., 1977, p. 624). A review of the Kaiser-Permanente Health Examination data also revealed men and women who took three or more drinks of alcohol per day had higher systolic and diastolic pressures than non-drinkers or those consuming two or fewer drinks per day. The findings support regular or heavy use of alcohol as a risk factor of hypertension (Klatsky et al., 1977, pp. 1194-1200).

Oral Contraceptives

Of recent significance to women and the etiology of hypertension is the possible problem of oral contraceptives. A study of 46,000 women in Great Britain, half of whom were taking oral contraceptives revealed the following:

Hypertension may develop in five percent of users of the pill for over five years, that the incidence increased with duration of medication and that it tended to be reversed when the medication was stopped. (Genest et al., 1977, p. 623)

The Glasgow Family Planning Association study also revealed rise in mean systolic pressure after four years of oral contraceptive therapy and that pressure returned to pretreatment levels within three months after the use

of the pill was discontinued (Weir et al., 1974, pp. 533-535) .

The Kaiser-Permanente medical program in California found oral contraceptive use affected women of all ages. Pill users having slightly higher systolic and diastolic pressures than non-users (Fisch et al., 1972) .

The data available seem to support that 5 percent of women on pill therapy will experience some degree of reversible hypertension.

Environmental Stress and Personality

Hypertension has long been considered to be related to a person's adaptation to stress and to the psychosocial factors in his environment. In a review of studies related to blood pressure and environment, Gutman and Benson (1971) concluded:

Epidemiologic studies have suggested a consistent relation between elevated systemic arterial blood pressure and environmental conditions which require continuous behavioral adjustments from the individual. (Gutman and Benson, 1971, p. 543)

The main feature of adjustment which generates conflict are the many situations where no appropriate behavior is prescribed by tradition or prepared for in socialization while the person is maturing. Urban populations have higher blood pressure levels and hypertensive mortality

rates than do rural populations. Socio-economic mobility is associated with higher prevalence of elevated blood pressure as are life-threatening events such as combat and natural disasters (Ruskin and Schaffer, 1948, p. 228). Elevated blood pressure has been produced experimentally in animals by creating chronic stress states resulting in observable anxiety and behavior change. Even in animals, it appears to be behavioral adjustment which causes conflict and pressure elevation (Gutman and Benson, 1971, pp. 543-553).

Some attempts have been made at identifying a "hypertension personality", but results have not been conclusive. Studies have implied hypertension is associated with impulsive personalities lacking emotional control who are less able to deal with stressful situations. Characteristics of these personalities have included aggressive, ambitious, angry, and being compelled by time urgency. Rosenman and Friedman (1963) did correlate a "Type A" behavior pattern with coronary heart disease, but the correlation also included other dependents such as environmental setting and smoking (Gutman and Benson, 1971, pp. 543-553). Rosenman's et al. (1976) follow-up study continued to stress that Type A behavior characterized by enhanced aggressiveness and competitive drive, preoccupation with deadlines, and chronic impatience and sense of time

urgency is related to incidence of coronary heart disease (Rosenman et al., 1976, pp. 903-909). Freidmon and Rosenman's (1974) book, "Type A Behavior and Your Heart" observed that the coat of arms of the Type A individual might well feature a clenched fist wearing a stop watch. However, "Type A Behavior" does not always correlate with hypertension. The successful "Type A" discharges his drives externally and does not, in all cases, build up sufficient tension to elevate blood pressure.

Irvin et al. (1976, p. 83) describes hypertensive patients "as generally hyperactors/in blood pressure/to both acute physical and emotional stress as compared to normotensive patients.'

Studying hypertension among inner-city black women Smyth et al. (1976, pp. 30-35) could identify Type A behavior and Type B (more relaxed behavior). In her discussion she stated it does not seem supportable at this time to try to retrain Type A behavior, as it seemed a response to variables (e.g., poverty) beyond the individual's control. Neser (1974, p. 24) agreed that it is the person who feels ineffectual in coping with peers and expectations of society who responds with hypertension.

O'Neil (1976, pp. 349-351) characterized hypertensives as having non-self-actualizing personalities which result

in inadequate behavior and feelings of low self-worth. She suggested counseling to become more self-assertive (O'Neil, 1976, pp. 344-351).

Henry and Cassel (1969) reviewed epidemiologic and animal experiments and found the stimulation of the "defense alarm response" over an extended period to be an important mechanism in essential hypertension. They cite studies where normal animals have hypertension induced by ingestion of desoxycorticosterone and extra salt in the diet. They proposed that the pressures of society whereby early learned responses do not guarantee successful or adaptive behavior may result in a physiological stress state and response which is like that to which the animals were experimentally subjected (Henry and Cassel, 1969, pp. 171-199).

Discussing the role of personality and its role, Henry and Cassel (1969) reported people with higher blood pressures had more abrasive, tense interactions with other people than a control group with lower pressures. Also, persons undergoing work and life style changes from authoritarian and controlled settings to less secure and more permissive settings had higher pressures (Henry and Cassel, 1969, pp. 192-193).

An interesting study demonstrating the role of work-induced stress compared blood pressure readings of air traffic controllers with assistant pilots. The controllers in consistently more stressful work settings had consistently higher blood pressures by age groups than the airmen. A previous study by the same researchers had reported high blood pressure readings on a group of men aware of their impending job termination (Cobb and Rose, 1973, pp. 489-492).

A more recent review of the influence of work environment on hypertension stated the following:

Usually, hypertension is related to a stressful event only if the event is undesirable. However, both pleasant and unpleasant stimuli can produce similar physiologic adaptive responses and it is probably change rather than undesirability that should be used as a measure of the stressfulness of a life event. The different ways in which individuals perceive, interpret, and react to similar environmental variables condition the subsequent variation in behavioral adaptation and determine who reacts by becoming hypertensive. (Mustacchi, 1977, p. 545)

Even television watching of a nature which creates emotional involvement can correlate with higher pressure readings (Mustacchi, 1977, pp. 533-534). However, it can not be stated that a causal relationship exists between work or emotional stress and development of hypertension. It does appear that its development may be accelerated in

susceptible individuals. In response to the theories of hypertension resulting from stress and elicitation of the emergency reaction, relaxation techniques have been used experimentally to lower blood pressure. Benson et al. (1974) tested patients already on hypertensive medication therapy. Using a wakeful hypometabolic state twice a day for twenty minutes over a twenty week period, the average blood pressure reading of the group decreased from 145/91 to 135/87. He, therefore, supports relaxation response as a useful treatment to augment drug therapy (Benson et al., 1974, pp. 289-291). In 1975, Patel (1975, pp. 93-95) had similar good results using "yoga" techniques with patients already under pharmacological treatment. In addition, Dowdall (1977, pp. 73-76) elicited good response using deep breathing, progressive relaxation, and yoga breathing exercises with a group of senior citizens under treatment for hypertension.

Compliance

One of the most vital areas for health care personnel to deal with is patient compliance. Noncompliance is the leading cause of treatment failure. Barofsky (1977) stated treatment of hypertensive patients has only been partially successful.

Limiting factors include:

- 1) Incomplete screening and detection of patients with high blood pressure; 2) drop out rate of patients following initiation of treatment, and
- 3) the noncompliance of patients with their established medication regimens.

As a result, a situation exists in which successful treatment of a disease is dependent not on the availability of appropriate prophylactic agents, but rather on the techniques available to implement and maintain the therapy. (Barofsky, 1977, p. xv)

Sackett and Haynes (1976) reviewed 185 compliance studies. Discussing the magnitude of noncompliance, they stated even compliance patients keep only 80 percent of medical appointments while others attend 50 percent or drop out of treatment altogether. Compliance with short term medication declines with each day of therapy while patients on long term medication are compliant only about 50 percent of the time (Sackett and Haynes, 1976, pp. Marston (1970) in a review of compliance literature reported demographic variables such as age and sex were not significantly related to compliance. For the most part, neither was socio-economic status. Although high educational level is associated with greater interest in preventive health measures, it has not been significantly related to increased compliance. Severity of illness increases compliance in acute illness; however, regardless of severity,

the longer the patients are under treatment the less likely they are to comply. When the medical regimen becomes more complex (more than one medication, frequent doses, or several recommendations), compliance is decreased. Knowledge of disease alone did not necessarily result in compliance. However, health beliefs and good patient-physician relationship did encourage it (Marston, 1970, pp. 312-323).

A study of factors influencing patient noncompliance by Vincent (1971) sought to "examine and analyze variables in the behavior of conforming and non-conforming individuals with reference to the sick role described by Parsons (1951)." Patients often experience conflict between their normal social role and their sick role obligations. For compliance to occur, the patient must believe medical regimen comes from a "legitimate authority." (Vincent, 1971, pp. 509-515) Vincent's (1971) findings also included that patients seeking treatment because of identifiable symptoms were more compliant than asymptomatic patients. However, knowing the reason for a prescription did not increase compliance beyond 50 percent, nor was there a difference when patients knew possible serious complications could result from noncompliance. Blacks and Puerto Ricans were less compliant than whites, possibly rejecting the "authority" of the regimen. Protestants were less

compliant than Catholics. Level of education did not increase compliance. Married women were less compliant than widows, while married men were more compliant. This possibly demonstrates the social support a wife will give a husband in the sick role while the reverse is not true (Vincent, 1971, pp. 509-515).

Cultural beliefs concerning illness affect behavior in seeking medical care and complying with treatment. Jenkins (1977) states:

What people do in response to illness depends on the way they perceive the disease. The patient is influenced by group values, pressures for conformity, normative behavior and situational convenience. All determine how a health service will be accepted. Also, there must be a reward to treatment, effectiveness of treatment, pleasure or social approval, a feeling of reduced tension and enhanced self-esteem. (Jenkins, 1977, p. 12)

These findings support the health belief model theory that susceptibility to a disease increases action and compliance. If a wide gap exists between patients' knowledge of disease and therapy, their compliance with that therapy decreases. Compliance with one aspect of the regimen favors compliance with others, and finally strong support of the family increases compliance. Becker's (1978, pp. 35-40) Health Belief Model components include:

- 1) Perceived severity of disease, 2) Perceived benefits

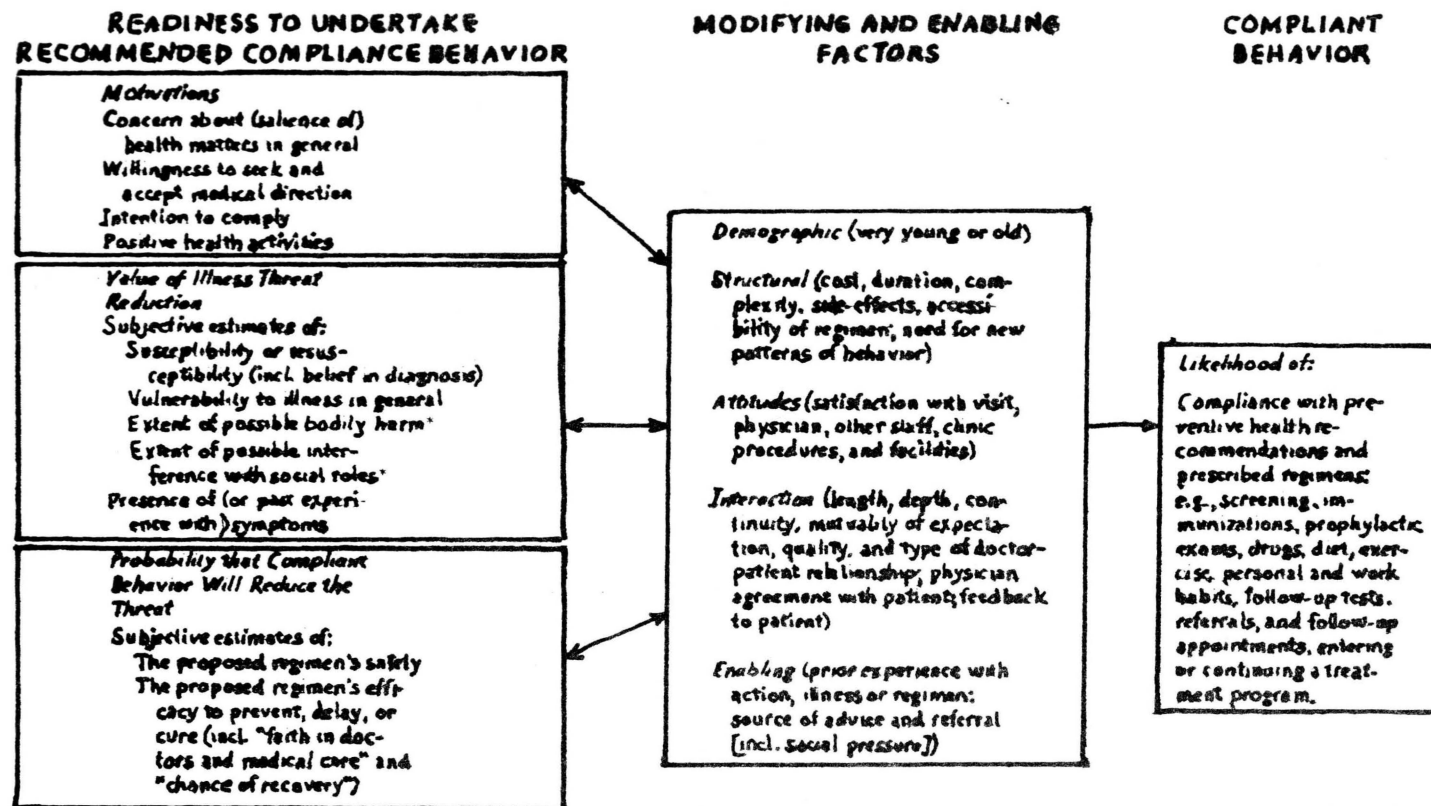
and costs, 3) Motivation (emotional arousal) and modifying factors (relationship with practitioner and personal variables.) The following model shows the relation of these variables as pictured by Becker (1978, p. 4).

(Figure 5)

A compliance study in 1959 examined reasons people failed to seek polio vaccination. Many of the attitudes and findings have relevance for all preventive medicine. Two factors, personal readiness and social situational factors, were reported to determine acceptance of treatment. Believed susceptibility to the disease, perceived seriousness, and belief of effectiveness of treatment were stated as determinants of personal acceptance of therapy. Peer social pressure and convenience are the major components of treatment acceptance. Higher education level and social class increased acceptance, but in some cases this was overcome by social pressure (Rosenstock et al., 1959, pp. 98-103).

While beliefs may motivate acceptance of treatment, they do not necessarily result in behavior changes where life styles and long established habits are involved. Haefner and Kirscht (1970) instructed patients with films on cancer, heart disease, and tuberculosis. Results showed patients' belief about severity of these diseases was altered.

FIGURE 5. HYPOTHESIZED MODEL FOR PREDICTING AND EXPLAINING COMPLIANCE BEHAVIOR



*At motivating, but not inhibiting, levels.

However, personal living habits such as exercise, caloric intake, and medical checkups were not affected (Haefner and Kirscht, 1970, pp. 478-488).

Altering one's belief about health may be sufficient to change actions that are largely motivated by health matters but will usually be insufficient to alter behaviors that simultaneously satisfy a variety of motives. (Haefner and Kirscht, 1970, p. 483)

Reporting in a study of drug therapy compliance, Blackwell (1973) reported from 25 percent to 50 percent of all outpatients fail to take medication. In addition, many others make dosage mistakes or take medication without direction of a physician. It was also found that taking multiple medications or taking them more than once a day increases noncompliance (Blackwell, 1973, pp. 249-252).

When treatment is prophylactic or the condition is asymptomatic, compliance with medical regimen decreases. When a person feels well, he may gamble on his continued good health and discontinue treatment. In chronic illnesses, "forgetfulness, complacency, and boredom," contribute to nonadherence and an increased dropout rate. Patients living alone are also more likely to default lacking external support and motivation to carry out therapy (Blackwell, 1973, pp. 249-252).

Blackwell (1973) stresses the important role patient attitudes play in adherence to therapy. Patients who do not wish to comply simply stay away from medical advice and treatment. He reviewed other studies which have described noncompliers as hostile and having personality profiles which are immature and enjoy risk taking. These persons are often difficult to successfully treat. On the positive side, he stresses that patient response is best when treatment is prescribed by a familiar, well-liked physician and the treatment regimen is well understood by the patient (Blackwell, 1973, pp. 249-252).

The two-year results of the National Hypertension Detection and Follow-Up Program also support that a good level of patient adherence can be achieved and blood pressure control maintained long term when communication between medical personnel and patients is optimum. The two-year report includes,

Repeatedly patients have commented favorably on the uniqueness of a medical experience in which they are given the time and encouragement to ask questions and discuss problems of therapy.
(Stamler, 1975, p. 1230)

Long term therapy requires frequent encouragement, early recognition of harmful and unpleasant side effects, and a step-by-step approach to therapy which cuts down on the

discouraging side of treatment. Recommendations include problems of accessibility of medical care, controlling cost of care, and providing trained paramedical personnel to help the physician (Stamler, 1975, pp. 1227-1230).

Studying the dropout problem in antihypertensive treatment, Caldwell et al. (1970) found 74 percent of patients discontinued clinic treatment in a five year study. Forty-two dropout patients were compared with twenty-four patients who remained in treatment. They were compared as to age, race, education, occupation, income, duration of disease, and characteristic differences. As a group the dropout population was younger, more likely to be black, had less education, was predominantly blue collar, had less income, and had known of their diagnosis of hypertension for a shorter period of time. His findings supported others: that being in a lower social class increases termination of treatment. Lower class patients are faced with daily economic needs which conflict with health needs. Patients of higher education and income tend to make long range plans more readily and accept the idea of preventive medicines. The effect of "duration of illness" in most patients appeared to be a learned response. Most long term patients had experienced at least one hypertensive emergency which served as a strong reinforcement for the patient and also fostered strong family

encouragement for the patient to stay in therapy (Caldwell et al., 1970, pp. 579-582).

Patients who remained in treatment did so primarily because of a good understanding of their disease and a good relationship with their physician. In contrast, many of the termination group reported they stopped treatment because they felt good and nearly all expressed dissatisfaction with the clinic's rotation system of doctors (Caldwell et al., 1970, pp. 579-592).

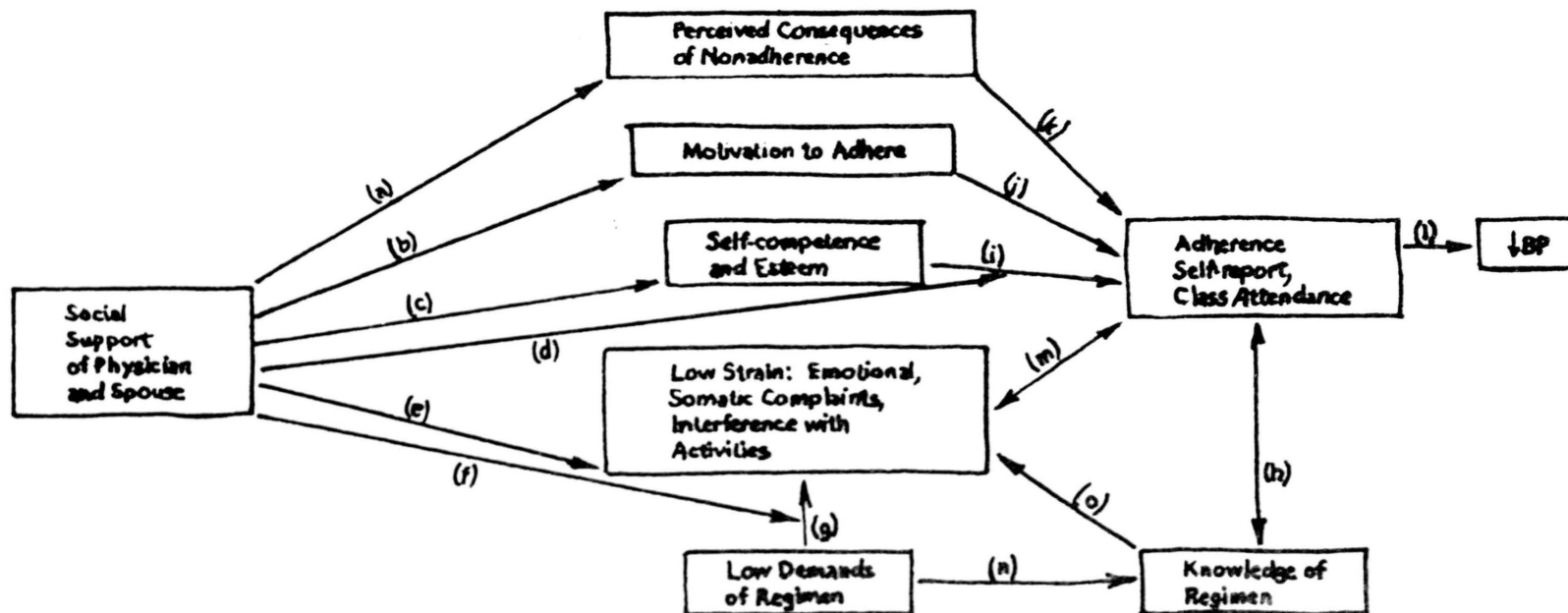
Patient education alone does not insure continued treatment. Studying hypertensive clinic dropouts in a large urban city, it was found that the dropout population was, "an intelligent, concerned group of patients whose motivation was limited by barriers on their time and who clearly viewed the system as not directed to their concerns." The recommendation of the study included compliance could be increased in clinics which 1) have short waiting times, 2) provide personal physician-patient relationship, 3) provide comprehensive health care on a twenty-four hour basis, and 4) provide services conveniently for the patient (Finnerty et al., 1973, pp. 242-244).

In 1976 Caplan did a study of therapeutic effect with two hundred hypertensive patients. The report of findings included the following:

- 1) The patients who reported compliance did have lower blood pressures.
- 2) Patients with most accurate knowledge of their regimens had lower blood pressure.
- 3) Patients who thought the consequences of non-adherence as severe had lower blood pressure.
- 4) Complex regimens were less well understood and accompanied by more psychological strain
- 5) Adherent patients had fewer somatic complaints and less anxiety, depression, and hostility
- 6) Social support from spouse and physician increased compliance.
- 7) Patients with high self-esteem and social support were the best compliers.
- 8) Patients with high self-esteem and without social support had the lowest levels of adherence. (Caplan, 1976, pp. 2-4)

The following model demonstrates those findings of Caplan. (Figure 6)

FIGURE 6. SIMPLIFIED INTERPRETATION OF THE RELATIONSHIPS
AMONG VARIABLES IN THE STUDY OF ADHERENCE



Note: Arrows indicate probable causal paths. Where arrows intersect, the effect of the intersected arrow is hypothesized to be enhanced by the value of intersecting arrow. (Caplan, 1976, p. 4)

Many different approaches have been investigated and tested in the past in an effort to increase compliance. In a clinical pharmacy study it was found that having a pharmacist interview patients and instruct them about medications had only short range effects. During the program, compliance increased from 25 percent to 79 percent, but after its termination, compliance dropped to 42 percent (McKenney, 1973, p. 1104).

A study with hypertensive patients to improve compliance with appointment attendance revealed using a follow-up clerk to remind patients about doctor's visits did increase attendance. However, only 42 percent had controlled blood pressure readings. Effective blood pressure control must stress patient medication compliance and not just appointment keeping (Fletcher, 1975, pp. 242-244).

Teaching by public health nurses did not increase compliance with medical regimen in a study by Lowe (1970, pp. 59-63). She stated a better method of motivation is needed.

Another study to identify predictors of compliance found the most significant factors influencing compliance were length of time waiting for appointments, "faith" in physicians, perception of blood pressure interfering with activities, and perceived support from family, physicians, and nurses (Chesney, 1978, p. 50). Sackett, in 1975,

reported that neither convenience of treatment nor educational program increased compliance which indicated a need for more behaviorally oriented strategies (Sackett et al., 1975, pp. 1205-1208). In a followup trial of medication compliance strategies, thirty-nine noncompliant patients were encouraged to improve adherence by: 1) home blood pressure monitoring; 2) charting of home blood pressure and medicine; and 3) tailoring regimens to daily rituals. The results indicate a clinically significant portion of the patients were salvaged to warrant implementing these strategies with noncompliant patients (Haynes and Sackett et al., 1976, pp. 1265-1268).

These studies and many others point out the need for the patients to learn behavior modification as the single most important factor in blood pressure control. In a comparison of studies of patient compliance for therapeutic outcomes, educational approaches achieved a success rate of only 50 percent while behavioral strategies achieved a rate of 82 percent and combined strategies of 75 percent (Sackett and Haynes, 1976, p. 1266).

Behavior Modification

Behavior modification as described by Pomerleau et al. (1975, pp. 1277-1282) is an extension of the animal research by Pavlov and Skinner applying laws of animal learning to problems of human behavior: "The behavioral approach is characterized by an emphasis on relating measurable activity (response) to antecedent and subsequent environmental events (stimuli) (Pomerleau et al., 1975, p. 1279).

Contingency management and stimulus control concepts have developed from this approach. Reinforcing stimuli determine the pattern of subsequent behavior or positive reinforcement and have the effect of making the behavior that produced it more likely to be repeated. A stimulus can affect behavior because it is associated with a reinforcer or it signals a situation associated with the reinforcer.

Using self control methods the passive role of patient is transformed into the active one of participant. The person with the problem modifies aspects of his environment that in turn modify the problem behavior. (Pomerleau et al., 1975, p. 1282)

Behavior modification can be applied to medication compliance, obesity, smoking, and alcoholism, all of which affect the hypertensive patient. Programs vary with the individual patient and problem, but usually involve

establishing social reinforcements, a daily record of events and behavior concerning the problem, a system of rewards and the use of behavioral contracts to enhance the participants' commitment to the treatment procedure.

A recent study by Meyer and Henderson (1974) revealed:

. . . behavior modification produces greater changes in health habits than other procedures including individual counseling with a health educator and that the improvements observed were more lasting. (Meyer and Henderson, 1974, pp. 225-266)

Behavior modification goes beyond simple instruction and focuses on changing behavior. It involves assessing behavior and rewarding desirable behavior and extinguishing undesirable behavior. Several fundamental theories apply to behavior modification:

- 1) Favorable behavior may be increased by following it with a positive reinforcement.
- 2) Negative behavior should be ignored or punished.
- 3) If a person is to stop doing something, there must be something else to do in its place (displacement).
- 4) Old behavior must be denied reinforcement and the new desired behavior immediately effectively reinforced (Berni, 1978, pp. 7-9).

Changing behavior usually involves counting it and then tying in with movement cycles. Assessment involves when a person does something, what happens before and after the behavior and how often it happens. This knowledge is necessary to control the situation and be able to change it. Tangible, visible rewards are the best reinforcement. Punishment is often only temporary, and it makes people unhappy. Rewards and incentives are positive and are pleasurable (Berni, 1979, pp. 27-36). The environment must be manipulated to provide cues for desired behavior. Control over behavior can be enhanced by self-observation and self-recording (Kazdin, 1975, pp. 194-195). Self-control training is the goal of behavior modification. The environment is utilized to provide reinforcement (praise, self-esteem, social interaction), but the goal is to develop new behavior which is performed consistently with only self-reward and the natural consequences (Kazdin, 1975, pp. 62-63).

Contingency contracting is a strategy developed from behavior modification theory. Describing its use with hypertensive patients, Steckel and Swain (1977) formulated a written form. Desirable behavior is stated in measurable and realistic terms. Two goals are set as target behaviors such as losing weight, taking medicine, recording food intake, and home blood pressure monitoring. The ultimate

goal is controlled high blood pressure. Tangible rewards are agreed on. Comparing contract patients with routine care patients, there was a statistically significant reduction in clinic dropouts, increased blood pressure control, and increased weight loss to attest to the effectiveness of providing this type of reinforcement (Steckel and Swain, 1977, pp. 81-84).

A study at John's Hopkins Medical Center, "Health Education Strategies for Hypertension Control" pointed up many of the advantages of contingency contracting (German and Chwalow, 1976, pp. 41-45). Many health educators are reluctant to impose restrictions on patients that dramatically alter their life style. "What right do I have to impose my beliefs and values on patients?" The contract allows the health staff to be educators and the patient's "self-determination" in deciding his own behavior changes. The contract allows the health educator to assess "the capacities, motivation, and life situation of the patient" so as to understand more clearly and realistically the responsibilities that can be expected. The contract allows for clarity of purpose.

The mutual nature of the contract sharpens educational diagnosis and helps identify intractable situations or situations of minimal potential. (German and Chwalow, 1976, pp. 41-45)

A similar approach is recommended by Foster and Kousch (1978) who have developed "an educational assessment and counseling approach based on the patients' perceptions and behaviors." It involves a hypertension assessment form stressing the patients' health beliefs, his medical and family histories, and his abilities to cope with stress. A social support system is stressed. A plan is developed and behavioral strategies are utilized to achieve goals. On follow-up visits a hypertension encounter form is used to assess compliance, give reinforcement, and plan new interventions (Foster and Kousch, 1978, pp. 829-832).

The contract provides a written outline of behavioral expectations. It reduces ambiguity and results in less confusion than customary general instruction. It has incentive value for the patient who is reinforced by attainment of self-established goals. (Zifferblatt, 1977, pp. 79-93)

Other sources, while not demanding contracts, do emphasize patient participation, education, and home blood pressure measurement to motivate compliance (Maloney, 1978, pp. 26-35). Extensive counseling, short waiting time for visits, seeing the same practitioner on each visit, and follow-up phone calls to encourage appointment keeping are stressed to increase adherence to medical regimen (Ward et al., 1978, pp. 824-828).

Increased compliance has been reported when educational interventions become more behaviorally oriented. In a clinic population a program of three interventions were successful. Each patient had an individual interview to clarify therapeutic regimen and identify personal problems. A home visit was made to increase family support and a series of small group meetings were held to increase patient motivation and feeling of self-control. Blood pressure control increased by 28 percent in patients who participated in the program (from 38 percent to 66 percent) while a control group remained at 42 percent compliance (Levine et al. 1979, p. 1200).

Role of the Nurse in Hypertension Control

In a Canadian study it was found that despite available therapy and intensive education programs, less than 30 percent of an identified hypertensive population had adequate control when monitored by physicians alone. When specially trained nurses were assigned to employee health units to monitor therapy, compliance improved and patient acceptance was high as witnessed by the low rate of dropouts (Achber et al., 1978, p. 33).

Good communication and high quality of care was also supported in a study in an Iowa City review of nurse practitioner effectiveness. Patients cared for by nurse practitioners had higher knowledge levels of long term risk factors of hypertension, drug side effects, and nature of hypertension than patients seen by physicians and medical students (Batterman, 1978, p. 39). This study also shows the importance of continuity of care and the vital importance of the patient teaching role.

Registered nurses following five hundred patients at the Harlem Hospital Center had a dropout rate of only 25 percent over a twenty-seven month period. They also reported good blood pressure control in almost 100 percent of patients that remained in therapy (Branche et al., 1978, p. 44). The successful role of the nurse as educator and practitioner was also proven in a Vanderbilt University Hospital study where newly diagnosed hypertensive patients are admitted for a three to five day evaluation period. Management by nurse therapists emphasizes education, assessment of the patient's psychosocial needs, and establishment of continuing involvement with the patient on return visits. A compliance rate of 73 percent has been accomplished using this approach (Heimberger and Pulliam, 1978, p. 86).

A more detailed description of the Nurse Clinician role was provided in a study at the West Georgia Medical Center. Good compliance was correlated with a three-step program as follows:

- 1) extensive education
- 2) drug review and display techniques
- 3) aggressive follow-up

Verbal communication should have a well delineated format. Specific material reviewed each visit and patient report of drug taking habits. A supportive, non-judgemental approach with strong verbal reinforcement. The patient's ability to reach treatment goals should be stressed. The clinician should have a cheerful demeanor and be appropriately attentive during interviews. (Jones, 1976, p. 95)

Training a hypertension nurse specialist does not have to be lengthy or expensive. A two-day advanced hypertension Management Course was developed in North Carolina to train Registered Nurses as physicians extenders. Seven hours of lecture were combined with practical experience in a model clinic, and additional instruction using videotaped material and computer teaching (Burgess et al., 1978, p. 116).

Hypertension care should not be limited to the nurse specialist. Hospital staff nurses and clinic nurses play an important role in screening, diagnosing, and in maintaining hypertension control (Jones, 1976, pp. 283-295).

Fink stated,

It appears there is sufficient promise to explore further the non-physician 'management specialist' role whether it be the nurse practitioner, clinical pharmacist, physician assistant, or other type of health worker. To develop management services for a large number of health problems less costly than physicians and equally effective, personnel need to be developed. (Fink, 1976, p. 117)

Poor compliance in clinic situations has usually been related to appointment breaking because of long waiting periods and erratic taking of medication by patients. Nurse practitioners have been effective in reducing both these problems. Using physician extenders, clinics can see from fifty to eighty patients daily in a courteous and personalized manner. Quantity and quality of care can be a reality. Several studies in large hospital medical clinics attest to nurses being well accepted as a source of primary care (Finnerty, 1975, pp. 93-94; Lewis and Resnick, 1967, pp. 1236-1241; Spector, et al., 1975, pp. 1234-1237). Other studies also support medical regimen compliance as comparable or better than with physicians working alone (Clark, 1976, pp. 903-904; Stamler et al., 1975, pp. 1227-1230). The nurse's role in hypertension therapy appears well established and beneficial to improved patient treatment.

Patient Teaching

As previously stated, patient knowledge of illness and treatment do not necessarily equal compliance with medical regimen. However, education in these areas remains a part of influencing patients to closely adhere to treatment and modify behavior. How does the nurse and her role fit into this picture, and why teach patients if it doesn't guarantee results?

Very simply, the patient has a right to know. Patients should be informed about their illnesses, their possible consequences, and measures which are available to alleviate or make less severe their effects. Nurses have a professional obligation to teach. Most nurse practice acts in the United States designate teaching as a function and responsibility of the Registered Nurse. The teaching obligation concerns not only illness and treatment, but instruction in maintenance of health and prevention of disease (Smith, 1977, p. 597).

The American Hospital Association in 1972 instituted a "Patient's Bill of Rights." This included the patient's rights to knowledge of their diagnosis, treatment available, and possible harmful effects of medicine or therapy. To function as a responsible member of the health care delivery team, the nurse must protect the patients' rights through teaching (Narrow, 1979, p. 8).

Hypertension is a serious, but often symptomless disease. Having the patients accept and take seriously the diagnosis is often the first and one of the most difficult tasks in initiating therapy. Emotional factors often play a critical role in beginning and continuing treatment. Denial is often used: "If I don't feel bad, how can I be ill?" Doubt often exists in the mind of the patient concerning the reality of the diagnosis. As some studies have demonstrated, many patients adhere to medical regimen only after a frightening or life-threatening event has occurred. Early instruction concerning the dangers of uncontrolled hypertension might be able to prevent some of these events (Conte, 1974, p. 912).

Feelings of guilt and depression often accompany a diagnosis of this nature. "What did I do to deserve this?" Information about the large number of persons affected and stressing the successful side of therapy is a must.

Certainly, fear can be a recognized or unrecognized feeling. Any change in a person's life which requires long term medication and possible numerous life style changes is frightening and unwelcome. Patients must be made aware of the positive and beneficial results of treatment. The prognosis for increased length and quality of life must be stressed. Knowledge of undesirable complications of uncontrolled hypertension are only a part

of the picture. The studies revealing decreased strokes, heart attacks, and increased longevity to persons who accept treatment must be the center of attention.

Organization and the preparation and delivery of a successful nursing health education program requires several steps. The nurse must decide who to teach, what to teach, and choose an appropriate method of instruction.

Teaching can be defined as "a deliberate intentional action that is undertaken to help another person learn to do something he presently can not do." (Narrow, 1979, p. 3) However, health education is more than the mere process of giving information. It should be a joint effort with the patient and the nurse setting the goals together. The individual needs, attitudes, perceptions, and the life-style of the patient must be considered along with the instruction concerning disease process and medical regimen (Mitchell, 1977, p. 808).

A change in behavior is an indicator of learning in any situation. The change desired in this instance is adherence to medical regimen. Utilization of the nursing process, assessment, diagnosis, planning of interventions, and evaluation is the most organized approach (Narrow, 1979, pp. 50-55).

It is important to develop adequate skills in interviewing. Assessment involves gathering data about the

condition of the patient (diagnosis) and data from the patient about his motivation and ability to learn. Pertinent information should include past experiences in similar situations, present lifestyle, and future expectations (Narrow, 1979, p. 61).

Before deciding how to teach, the nurse must take into consideration individual traits such as reading skills, memory, and attention span. The method chosen will also be determined by time limitations, space, and materials available, and whether teaching will be on an individual or group basis (Narrow, 1979, pp. 93-100).

It must also be remembered that for significant learning to take place the patient must clearly understand the problems and issues that are to be resolved. The patient must not be in any distracting mental or physical discomfort and must realistically have the energy and capability (mental and physical) to attain the goals set (Murray and Zentner, 1976, p. 46).

Learning objectives should be behavioral. The patient should be asked to tell the nurse why he wants to learn about hypertension and blood pressure control. State the subjects that are pertinent and choose methods that are acceptable to the patient.

What does a patient with hypertension need to know?

Most nursing and medical protocols include the following:

- 1) Understanding the diagnosis, a definition of hypertension, its causes, risk factors, simple pathology, symptoms, long term complications, and life style changes which help control it.
- 2) Understanding of blood pressure readings and how to take blood pressure if the patient expresses interest.
- 3) An explanation of drug therapy, the importance of continual compliance, side effects from individual drugs, and possible complications should be stressed.
- 4) Discussion of diet as to sodium restriction and, in some cases, potassium replacement.
- 5) Discussion of weight control. Written and oral instruction should be given.
- 6) Encouragement of appropriate exercise and activities that relieve stress and anxiety.
- 7) Explanation of the increased risk involved with cigarette smoking, alcohol use, and oral contraceptive therapy (Long et al., 1976, pp. 765-770; Mitchell, 1977, pp. 808-809).

When counseling patients concerning their medical regimen, the nurse should try to help the person think of themselves as doing these things to maintain health rather than treat illness. Patients should have a feeling of controlling the things that affect their body rather than the disease controlling them.

Most hypertensive patients are adults and the communication should reflect it. Respect the patient. Solicit his attitudes and feelings. Be patient and concerned. Never make the patient feel dumb, inept, or put down. Reprimanding is to be avoided. Lessening of self esteem is a detriment to learning. Be positive and don't overwhelm the patient with technicalities. Repeat and stress the important factors in various ways. Be realistic and expect some success and some failure (Murray and Zentner, 1976, p. 44).

In most health care settings personal conversation and interview type situations are the most common. These are most useful for individual instruction and patient assessment. When the situation allows, the nurse may utilize other teaching aids such as written materials and audiovisual presentations.

Giving feedback to patients about their progress is one of the most vital areas in assuring their continuing in therapy. Make sure comments are positive and

constructive. Negative value judgments make people feel defensive and often avoidance is a defense mechanism employed. Focus on behavior that can be changed and aid the patient in identifying an acceptable way in which to reach goals (Kramer and Schmalenberg, 1977, p. 102).

Group teaching with hypertensive patients is often helpful. It allows people with similar problems to share their concerns, feelings, and difficulties in adjusting to their medical regimen. Often, things are verbalized by one person that another patient has been afraid to bring up. There is an atmosphere of mutual support in group encounters that reduces loneliness and isolation (Conte et al., 1974, p. 912).

Even after the decisions of who to teach, what to teach, and what method to use are made, problems still exist. Adult patients are often difficult students. People derive security from the way they live, eat, and function. They have many preconceived perceptions about health and an acceptable life style. Asking patients to change and adopt new habits is not an easy task. Often a "sell job" must precede instructions. Topics and different aspects of the medical regimen must be attacked, individually. Choose simple goals in the beginning. Patients need to experience success to have the motivation to continue with the learning process (Sturdevant, 1971, p. 44).

Accept that some patients have limited reading and verbal skills. Some have limited mental ability, and others do not have the emotional stability to cope with dramatic change. Physically and emotionally, people have personal limitations. Some persons have difficulty assuming responsibility for their own welfare. In these cases teach patients what they are willing to learn and able to deal with personally. Then look toward the patient's supporting individuals for help. Teaching family and significant others can be equally as important as teaching the individual himself (Sturdevant, 1977, p. 45).

In all situations accept some success and some failure. Constantly reinforce desired behavior and repeat critical areas using different approaches until the desired goals are at least acknowledged. Employ all the resources available and continue to strive for optimum adherence to prescribed therapy.

Summary

The review of literature revealed hypertension to be one of the most common chronic diseases in the United States today, and a major health problem. Although its etiology remains unknown, effective treatment is available and the result of successful treatment is increased quality and

length of life for the patient. Patient compliance with medical regimen in hypertension therapy is especially difficult since treatment involves the patient's total lifestyle. Hypertension is a symptomless disease, and the effects of noncompliance are not immediately felt. The burden of providing motivation for compliance must come from the health care team and the patients themselves. Compliance can only be attained when the many facets of the problem are attacked on an individual basis. Traditional methods of patient education and instruction remain a vital part of treatment. However, more behaviorally oriented strategies such as contingency contracting and home self-monitoring by patients have been shown effective in increasing compliance. Compliance is also increased in health care treatment situations where there is a personal relationship between medical personnel and patients, and where follow-up care is convenient and not excessively expensive.

Nurses specially trained in hypertension control have been well accepted by patients as both the primary provider of health care and as physician's assistants in hypertensive clinics. The role of the nurse as a health educator has been very successful resulting in increased continuity of care and increased compliance with medical regimen.

CHAPTER III

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

Introduction

In order to determine if factors influencing long term compliance with hypertension control could be identified, a descriptive survey was conducted. The survey involved receiving permission from participants to review their medical records for history of blood pressure readings, weight control, and regularity of appointments. In addition, these patients were asked to complete a two-part questionnaire. The first part of the questionnaire was a self-report of compliance, and the second part consisted of a questionnaire to assess the knowledge of the patient about hypertension, its effects, and therapeutic measures to control it. Following completion of the questionnaire, participants were interviewed by the nurse researcher and were given instruction concerning the correct answers to the knowledge portion. In addition, any responses on the compliance section which suggested activities which were noncompliant were discussed and methods of improvement

suggested. The study was descriptive in nature and non-experimental in design.

Gay states the purposes of this type of study as follows:

Descriptive research involves collecting data in order to test hypothesis or to answer questions concerning the current status of the subject of the study. A descriptive study determines and reports the way things are. The descriptive researcher has no control over what is, and can only measure what already exists. (Gay, 1976, p. 76)

The study was considered basic nursing research to discover new knowledge and identify activities in which the nurse can appropriately counsel patients. Abdellah defines basic research as:

That type of research which is directed toward increase of knowledge in science. It is research when the primary aim of the investigator is a fuller knowledge or understanding of the subject under study. (Abdellah, 1965, p. 128)

The study was a retrospective evaluation of data from participants following traditional physician-oriented hypertension education and at least three years of treatment. The researcher had no power to manipulate variables or influence the subjects. The aim of the study was to describe the data collected and the facts reported.

Setting

The survey was conducted in a private physician's office in a large metropolitan, southwestern city with a population of approximately 750,000. Patients were asked to participate in the study at the time of regularly scheduled office treatments. The physician is in general practice and accepts patients of both sexes and any age or race. All patients are private, treatment is voluntary, and expenses the responsibility of the individual.

Population

Study participants were contacted in the private practice of a general practitioner during October 1979 at the time of regular follow-up treatments for hypertension. There were approximately one hundred and fifty patients under active treatment for hypertension in this practice. Compliance with medical regimen varies greatly among the individuals. Many patients were over age sixty-five and were also under treatment for other conditions including arthritis and diabetes mellitus. The practice was composed of mostly urban middle class persons of Caucasian, Black, and Mexican-American descent. Participants were to meet the following criteria:

- 1) English speaking literate adults over twenty-one years of age
- 2) Diagnosis of essential hypertension
- 3) Medical regimen was restricted to patients controlled with:
 - a) thiazide diuretics
 - b) weight control
 - c) dietary salt restriction
 - d) abstinence from smoking
 - e) abstinence from alcohol
- 4) Patients included must have been diagnosed and under treatment for a minimum of three years. The sample consisted of eighteen subjects. Data were collected October 1, 1979, through October 31, 1979.

Tool

The review of literature conducted at the beginning of this study did not reveal a tool acceptable to cover all the factors the researcher wished to include in the study. Therefore, a questionnaire was developed by the investigator. A compliance assessment was conducted in the form of self-report of medication compliance and a review of recorded body weights and blood pressure readings for the last three years. The tool was a two-part

questionnaire which examined:

- 1) Demographic data
- 2) Hypertension knowledge survey
- 3) Behavior modification survey in the form of an interview investigating life style changes, if any, since a diagnosis of hypertension and the individual techniques used to enhance compliance to medical regimen.

Face and content validity was established by a panel of experts who had interest in the treatment of hypertension. This panel included both physicians and professional nurses. A lay panel was utilized to ascertain that instructions were clear and that terminology was understandable.

Data Collection

Formal permission for the study was obtained from the Thesis Committee, the Committee on Human Rights at Texas Woman's University, and the physician in whose office the study was conducted.

The following guidelines were utilized concerning patient participation in the study:

- 1) Patients were given a verbal explanation of the study and asked to participate during regular visits to their private physician in his office.
- 2) Participants signed a release form giving permission to utilize their completed questionnaires in the study and to review their medical records and utilize weight and blood pressure readings recorded since their diagnosis of hypertension.
- 3) Subjects agreeing to participate were asked to complete a written questionnaire.
- 4) Individual results were treated as confidential.
- 5) Subjects could withdraw at any time or refuse to answer any questions.
- 6) Subjects expressing interest were provided a summary of the findings.

Treatment of Data

Participants in the study were assigned to two groups, the compliant and the noncompliant groups according to self-report of medication compliance and office records of blood pressure readings. The scores of each group on the knowledge test were compared on a frequency polygon, and the means of the scores of each group were compared to one another. The t-test was utilized to ascertain if there was a significant difference between the two groups.

Each individual patient was scored according to their self-report of compliance with hypertension risk factors and the means of the scores of the two groups were compared using the t-test to determine if there was a significant difference. Demographic data concerning the participants were discussed in narrative, and the frequency distribution was illustrated on a chart.

Behavior modification patterns of patients in relation to the hypertensive risk factors, recorded during the interview portion of the survey were reported and discussed in narrative summary. Tables were utilized to demonstrate frequency of behaviors reported by individuals, and percentages of the two groups were compared.

Summary

A descriptive survey of patients with diagnoses of essential hypertension was conducted to investigate factors which are consistent with compliance to medical regimen. A written tool was developed by the researcher to investigate patient knowledge of the disease and their medical regimen. An oral interview was also conducted to report behavior modification patterns in relation to medical regimen. Patients were assigned to compliant and non-compliant groups according to self-report of medication compliance and past records of blood pressure readings.

The two groups were compared concerning knowledge, compliance with medical regimen, and compliance with hypertensive risk factors. Behavior modification patterns in relation to treatment of hypertension was recorded and discussed. The aim of the study was to assist patients to adhere to medical treatment and to identify factors which medical personnel could utilize when instructing patients.

CHAPTER IV

ANALYSIS OF THE DATA

A group of patients with the diagnosis of essential hypertension were investigated to study their knowledge level of the disease, assess compliance with medical regimen, and ascertain if behavior modification patterns in relation to hypertensive therapy could be identified. For the purposes of this study patients were assigned to a compliant or a noncompliant group according to self-report of medication compliance and record of controlled blood pressure over a three-year period. The two groups were compared concerning knowledge level and compliance with life style behavior modification in relation to hypertensive "risk factors" including obesity, dietary salt restriction, cigarette smoking, and alcoholic beverage consumption. The investigation was carried out in the office of a private physician in a large urban city. The purpose of the study was to try to identify factors which influence patients to successfully comply with medical regimen in a chronic disease condition in which the patient's total life-style is involved. To the individual patients surveyed, it was an opportunity to review knowledge of

hypertension and their personal medical regimen. For the health personnel in the office it afforded an opportunity to examine current teaching methods and identify areas needing improvement. This chapter will review the results and interpret the findings of that study.

Description of the Sample

During the period October 1, 1979, to October 31, 1979, twenty-one patients were treated in the physician's office that met the criteria stated for the study. All twenty-one persons were invited by the nurse researcher to participate in the study. Eighteen patients completed the survey. Three patients stated to the researcher they would like to participate but didn't have the time. One gentleman subject who did participate took a large railroad pocket watch out of his pocket and placed it on the table in front of the researcher. He stated he would complete the form and interview if it could be completed in eighteen minutes.

The eighteen patients participating in the study revealed the following demographic data. There were nine men and nine females. Their ages ranged from forty-seven to ninety years. Sixteen persons were Caucasian, and two persons were of the Spanish-American race. Numerous black persons are under treatment for hypertension in the physician's practice; however, none were treated during the

month of the study. Eight of the men and one woman reported active employment outside the home. Three women were actively keeping house for themselves and others, while one man and five women stated they were retired. Nine persons were married and living with their spouses. One woman was single, and five women were widows. Patients were not asked about finances, but all patients were private, and most could be described as middle class. (Table 1)

Table 1
Chart of Demographic Data

Age Range	Number		Percentage
	Men	Women	
40-50	1	0	5.7
50-60	2	2	22.2
60-70	5	1	33.3
70-80	1	2	16.6
80-90	0	4	22.2
Total	9	9	100.0

Sex	Frequency	Percentage
Female	9	50.0
Male	9	50.0
Total	18	100.0

Race	Men	Women	Percentage
Caucasian	8	8	88.8
Black	0	0	0.0
Spanish American	1	1	11.2
Total	9	9	100.0

Marital Status	Men	Women	Percentage
Married	9	3	66.6
Single	1	0	5.7
Widow	0	5	27.7
Widower	0	0	0.0
Total	10	8	100.0

Findings

Patient compliance was determined by self-report of medication compliance and resulting blood pressure control to below 150/mmHg systolic and 90/mmHg diastolic. Patients who initiated blood pressure therapy at the beginning of the three-year period were allowed three visits to become compliant. Patients who revealed more than three non-compliant blood pressure readings during the three-year period were considered in the noncompliant group for the purposes of this study.

Areas of Compliance

Self-report of medication compliance was not found to be a valid measure. Review of the literature had revealed that patients tend to over-estimate self compliance. Several patients in this study who claimed compliance were found to have numerous noncompliant blood pressure readings because they had discontinued medication use in the past. Measures such as pill counts and urine measurement of medication level would have been more accurate. They were not employed because of the time and expense that would have been required.

Recorded blood pressure readings were also found to be an invalid measure of compliance. Several patients who

admitted irregular medication habits were found to have compliant blood pressure readings on the office records. These patients are simply careful to take their medicine for several days before visiting the physician.

Compliance

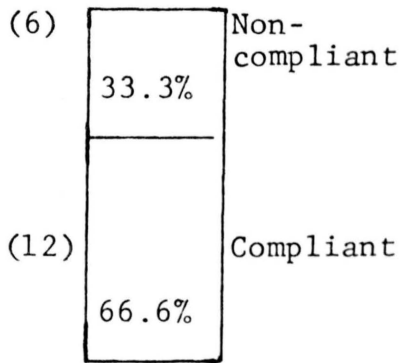
For the purposes of this study eleven patients were assigned to the compliant group. All eleven of these patients self-reported compliance with medication habits and their office records revealed controlled blood pressure readings for the three-year period reviewed by this investigation.

Seven patients were assigned to the noncompliant group for the purposes of this study. Three patients self-reported noncompliant medication habits, and their records also revealed noncompliant blood pressure readings. Three other patients who admitted noncompliant medication habits were assigned to this group even though their office records revealed compliant blood pressure readings. One patient who self-reported medication compliance, but had non-compliant blood pressure readings was also placed in the noncompliant group. The physician stated he believed this patient's self report was truthful. During the period of the study the person had experienced the death of their spouse and undergone several operations. The noncompliant

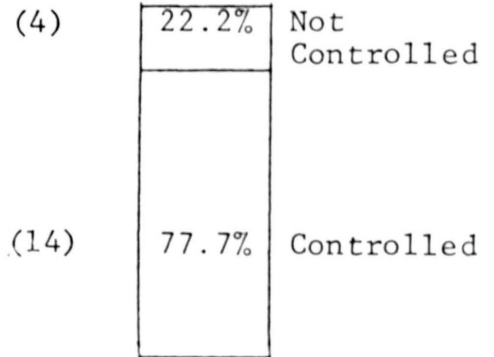
blood pressure readings were attributed to emotional stress.

FIGURE 7. AREAS OF COMPLIANCE

Self Report of
Medication Habits



Controlled
Blood Pressure



(N=18)

FIGURE 8. COMPLIANCE OF THE GROUP

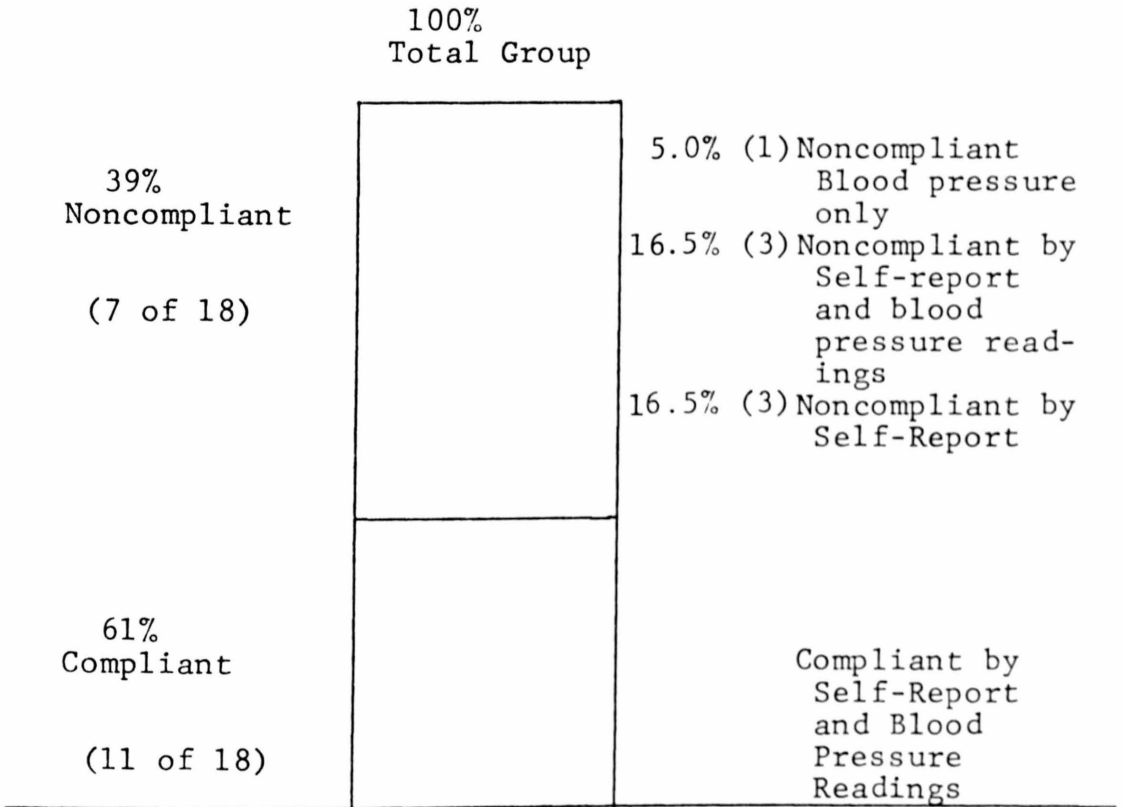


FIGURE 9. COMPARISON OF THE COMPLIANT AND NONCOMPLIANT GROUPS

Self Report of Medication Habits		Controlled Blood Pressure	
Compliant Group	Noncompliant Group	Compliant Group	Noncompliant Group
<div>100%</div> <div>(11)</div> <div>Compliant</div>	<div>86%</div> <div>(6)</div> <div>Non-compliant</div> <div>14%</div> <div>(1)</div> <div>Compliant</div>	<div>100%</div> <div>(11)</div> <div>Compliant</div>	<div>57%</div> <div>(4)</div> <div>Non-compliant</div> <div>43%</div> <div>(3)</div> <div>Compliant</div>

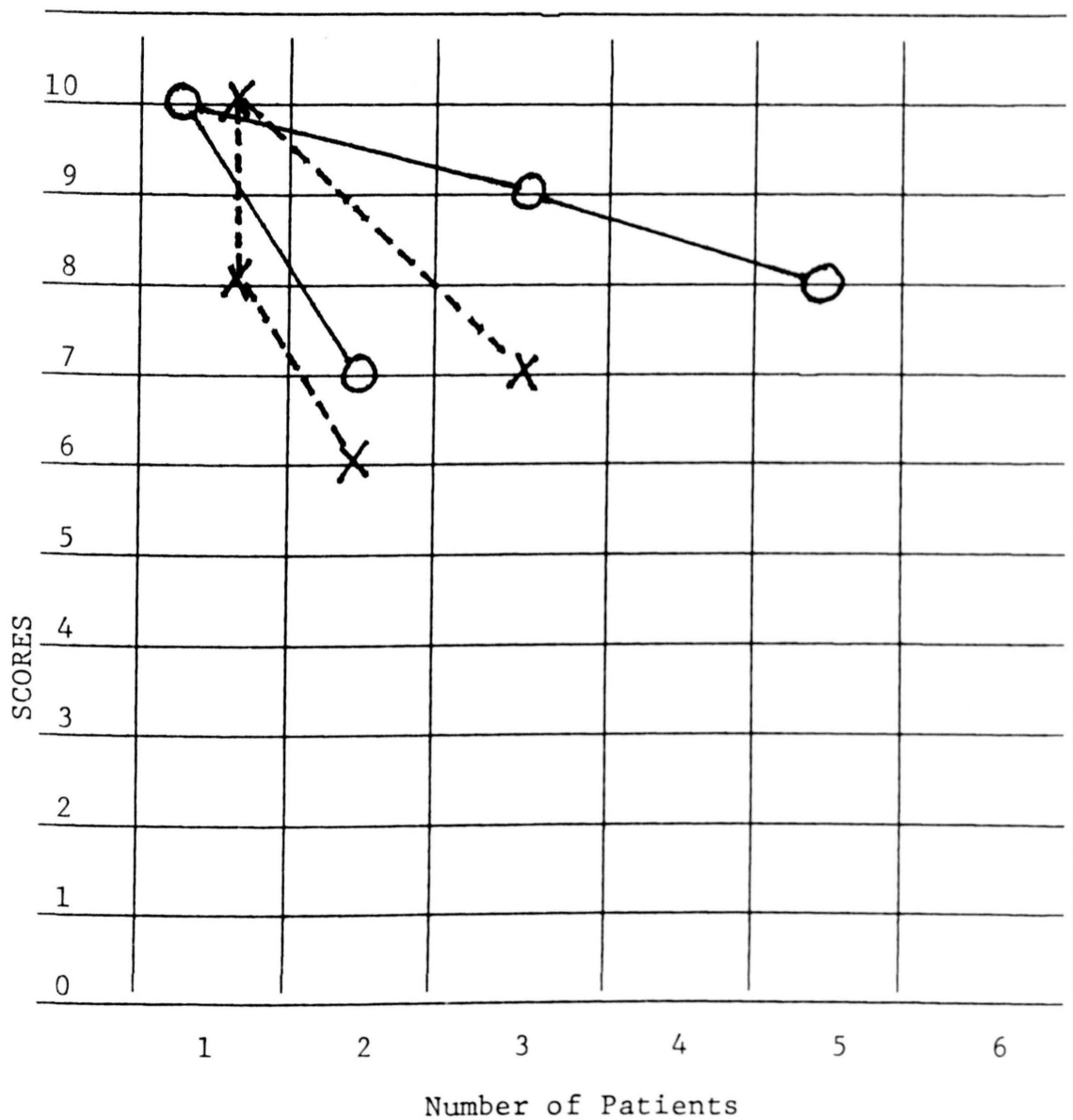
The Knowledge Test

The review of literature indicated that knowledge of disease and medical regimen would not necessarily correlate with compliance to medical regimen. This study would appear to support these past studies. The compliant group had slightly higher average scores of 82.7, compared to 72.8 for the noncompliant group. All of the scores were 60 percent or above, and many of the questions answered in error were found to be the result of older patients who did not understand multiple choice test questioning. During the post-test oral review of the questions, most patients were found to possess correct knowledge. The interview portion of the survey related nearly all patients had a good knowledge of what they should be doing, just an unwillingness or inability to be consistent.

Table 2
Knowledge Test Scores Distribution
and Comparison of Groups

Test Scores	Compliant		Noncompliant	
	Frequency	Percent	Frequency	Percent
100	One	9	One	14
90	Three	28	None	0
80	Five	45	One	14
70	Two	18	Three	43
60	None	0	Two	27
50	None	0	None	0
40	None	0	None	0
30	None	0	None	0
20	None	0	None	0
10	None	0	None	0

FIGURE 10



(0=Compliant, X=Noncompliant)

It was expected (hypothesized) that there would not be a significant difference between the knowledge scores of the compliant and the noncompliant groups. Accordingly, t-tests were performed comparing the means of their respective scores. (See Table 3 below.) The results confirmed that there was not a significant difference between the two groups.

TABLE 3. COMPARISON OF MEANS OF KNOWLEDGE TEST SCORES

	Compliant Group	Noncompliant Group	t	p
	(N=11)	(N=7)		
Knowledge Test Scores	82.7	72.8	.65*	>.05
*Not significant (p > .05)				

TABLE 4. THE KNOWLEDGE TEST

Question	Total Group	Compliant Group	Non Compliant Group
	No. %	No. %	No. %
1. Symptoms of high blood pressure include:			
a. headache, dizziness, fainting spells	7 (39)	5 (45)	2 (29)
b. There are no symptoms.	11 (61)	6 (55)	5 (71)
2. Blood pressure medication can:			
a. Cure high blood pressure	0		
b. Control high blood pressure	18 (100)	11 (100)	7 (100)
3. Uncontrolled HBP increases your chance of having other health problems such as:			
a. Heart disease, strokes, kidney failure, and blindness	17 (94)	11 (100)	6 (84)
b. Cancer, blood diseases and liver diseases	1 (6)		1 (16)
4. Risk factors which increase HBP and make control difficult include:			
a. overeating and excessive sodium use.	3 (16)	1 (9)	2 (29)
b. smoking and alcohol			
c. mental and emotional stress			
d. all of the above	15 (84)	10 (91)	5 (71)
5. If you have HBP it is wise to have which exams:			
a. a complete physical exam to detect other health problems	6 (33)	4 (36)	2 (29)
b. EKG and Chest x-ray	2 (11)	2 (18)	0

TABLE 4. (continued)

Question	Total Group		Compliant Group		Non-Compliant Group	
	No.	%	No.	%	No.	%
5. c. Eye Exam	1	(5.5)	0		1	(14)
d. Laboratory blood test to detect kidney problems	1	(5.5)	1	(9)	0	
e. All of the above	8	(45.0)	4	(36)	4	(57)
6. The goal of your medical treatments:						
a. make your B/P 120/80	7	(39.0)	4	(36)	3	(43)
b. control your B/P where the bottom (diastolic) reading is 90 or less	11	(61.0)	7	(64)	4	(57)
7. Which side effects of HBP are abnormal and should be reported to the doctor?						
a. Fatigue, frequent urination, decreased sex drive	1	(9.0)	3	(36)	4	(57)
b. Skin rash, blurred vision, nausea, headaches, feeling faint	10	(91.0)	8	(64)	3	(43)
8. To be effective, HBP medication must be taken:						
a. each day as directed	18	(100.0)	11	(100)	7	(100)
b. only when you feel bad or pressure is up	0		0		0	

TABLE 4. (continued)

Question	Total Group		Compliant Group		Non-Compliant Group	
	No.	%	No.	%	No.	%
9. If you have HBP and find it is up between Dr.'s visits, you should:						
a. increase your medication						
b. remember B/P changes during the day in response to stress and activity						
c. consult the Dr. if you feel in danger	1	(6)	1	(9)	0	
d. b & c	17	(94)	10	(91)	7	(100)
10. Controlling HBP with medication and diet can increase the length of your life and decrease your chance of having heart disease and other serious illnesses:						
a. True	1	(6)	0		1	(14)
b. False	17	(94)	11	(100)	6	(86)

Interview to Investigate Life Style Changes due to Hypertension

The interview portion of the survey was intended to identify any differences between the compliant and non-compliant groups and hopefully point out behavior modification patterns which are consistent with compliance. The first two questions were aimed at identifying the sources people consider reliable for information about high blood pressure and who or what strongly influences them concerning health behavior.

1. Which sources have provided you with information about high blood pressure?
 - a. doctors
 - b. nurses
 - c. pharmacists
 - d. TV & radio
 - e. magazines & newspapers
 - f. books
 - g. family & friends
 - h. other- _____
2. What most strongly influenced or persuades you to control high blood pressure?
 - a. advice of doctor or other medical persons
 - b. personal desire for health
 - c. urging of family & friends
 - d. fear of complications (illness resulting from uncontrolled blood pressure)
 - e. feeling bad
 - f. other- _____

Sixteen persons (89 percent) identified the doctor as their primary source of information about high blood pressure. Two persons (11 percent) stated they also consulted TV, radio, magazines, and newspapers. Nine

Seventy-eight percent (14) of the persons surveyed kept their medication in the kitchen. Three (17 percent) kept their medication in the bathroom, and one (5 percent) in the bedroom.

Nine (82 percent) of the compliant group kept the medication in the kitchen. Five (71 percent) of the noncompliant group kept the medication in the kitchen. Eighty-nine percent of the group stated they took their medicine at the same time each day. Ninety-one percent of the compliant group responded same time. Eighty-six percent of the noncompliant group responded same time.

One hundred percent of the respondents tried to tie medication taking to getting up, meal times, or bedtime. One hundred percent also stated they did not record or write down taking medicine.

Twenty-two percent of the participants said another person helped them remember their medicine. Eighteen percent of the compliant group reported assistance. Twenty-nine percent of the noncompliant group reported assistance. However, seventy-three percent of the compliant group listed a special method for remembering medication.

Five compliant patients had an extra bottle they put pills in at the beginning of the day. One compliant person set the pill bottle on the TV, and one person merely

put the medicine out on the kitchen counter. One compliant person had a "pill drawer" in the kitchen.

Only 43 percent of the noncompliant group reported special methods. Two persons would set the bottle out of the medicine cabinet each day. One person had an extra pill bottle.

Hypertension Risk Factors

Questions number nine through sixteen were concerned with hypertension risk factors.

Weight Control

Fourteen (78 percent) of the persons surveyed stated they had been advised to control weight as part of their medical regimen. Nine (82 percent) of the compliant group and five (57 percent) of the noncompliant group.

Table 5

Hypertension Risk Factors

Weight control	Total Group		Compliant Group		Noncompliant Group	
	No.	%	No.	%	No.	%
a. Weight within 15 lbs. of ideal	8	(44)	5	(45)	4	(57)
b. Weight which exceeds 15 lbs. of ideal	10	(55)	6	(55)	3	(43)
a. Were practicing weight control diet	10	(55)	6	(55)	4	(57)
b. Were not trying to control weight	8	(45)	5	(45)	3	(43)

Salt Restriction in the Diet

Only seven persons (39 percent) of the total group stated they had been advised to restrict salt in their diet (five, 45 percent, of the compliant group, and two, 24 percent, of the noncompliant group).

Table 6

Salt Restriction in the Diet

How much salt do you presently use?	Total Group		Compliant Group		Non-Compliant Group	
	No.	%	No.	%	No.	%
a. Cook with salt and add it at the table	3	(17)	2	(18)	1	(14)
b. Cook with salt only	13	(72)	7	(64)	6	(86)
c. Use salt substitute	0		0		0	
d. Do not use salt	2	(11)	2	(18)	0	

Smoking

Table 7

Cigarette Smoking

Question	Total Group		Compliant Group		Non-Compliant Group	
	No.	%	No.	%	No.	%
a. Smokes nicotine cigarettes	5	(28)	2	(18)	3	(43)
b. Non-smokers	13	(72)	9	(82)	4	(57)
a. Have stopped or reduced smoking because of HBP?	3	(17)	1	(9)	2	(29)
b. Have not changed behavior	15	(83)	10	(91)	5	(71)

Alcohol

The following tables reflects answers given to question numbers 16 and 17 on the study questionnaire.

Table 8

Alcoholic Beverage Use

Question	Total Group		Compliant Group		Non-Compliant Group	
	No.	%	No.	%	No.	%
16. a. Uses alcohol	12	(67)	7	(64)	5	(71)
b. Non-drinker	6	(33)	4	(36)	2	(29)
17. a. Have stopped or reduced alcohol use because of HBP	4	(22)	1	(9)	3	(43)
b. Have not changed behavior	14	(78)	10	(91)	4	(57)

Environmental Stress

The following table reflects answers given to question numbers 18, 19, and 20 on the study questionnaire relating to stress.

Table 9

Stress

	Total Group		Compliant Group		Non-Compliant Group	
	No.	%	No.	%	No.	%
18. Have you been advised that mental and emotional stress and worry may influence high blood pressure?						
Yes	16	(99)	11	(100)	5	(71)
No	2	(1)	0		2	(29)
19. Have you taken any steps to reduce the stress in your life?						
Yes	9	(50)	6	(55)	3	(43)
Beyond Control	9	(50)	5	(45)	4	(57)
20. Do you consider your present life style stressful?						
Yes	9	(50)	6	(55)	3	(43)
No	9	(50)	5	(45)	4	(57)

Examples given were one woman's husband dying of cancer and others stated living on a fixed income was stressful. Most persons stated close relatives and family problems were the chief sources of stress. One man who owned his own business considered work his primary source of stress, but laughed and stated he certainly did not intend to get rid of the business.

None of those surveyed had made any dramatic life style change in relation to diagnosis of hypertension. Most tried to escape stress through recreation or exercise.

Several individual stated they arranged to have a quiet time during each day. Of those surveyed, most participants listed such activities as bowling, square dancing, reading, and movie-going as ways to relax.

Five persons stated family problems as their primary source of stress. Two persons stated work as their primary source of stress. One person stated financial strain; and one said retirement was stressful.

Heredity

The following table reflects answers given to question numbers 21 and 22 on the study questionnaire.

Table 10

Heredity

	Total Group		Compliant Group		Non-Compliant Group	
	No.	%	No.	%	No.	%
21. Do any of your close relatives have high blood pressure?						
Yes	14	(78)	10	(91)	4	(57)
No	4	(22)	1	(9)	3	(43)
22. Have any of your close relatives had strokes or heart attacks?						
Yes	12	(67)	9	(82)	3	(43)
No	6	(33)	2	(18)	4	(57)

Regarding close relatives who have high blood pressure, seven persons named parents, one person stated an uncle, four persons named siblings, and three persons listed their own children. Quite a few persons stated they did not know if their close relatives were hypertensive because "back then you just didn't talk about things like that."

A large percentage of the patients did realize that they were at greater risk if they had a family history of hypertension.

Medical Monitoring

The following table reflects answers given to question numbers 23, 24, and 25 on the study questionnaire.

Table 11

Medical Monitoring

	Total Group		Compliant Group		Non- Compliant Group	
	No.	%	No.	%	No.	%
23. How often do you have complete physical examinations?						
a. yearly	7	(39)	4	(36)	3	(43)
b. every 2 years	3	(17)	3	(28)	0	
c. no regular schedule	8	(44)	4	(36)	4	(57)
24. How often do you have your eyes examined?						
a. yearly	7	(39)	5	(46)	2	(29)
b. every 2 years	4	(22)	2	(18)	2	(29)
c. every 3 years	4	(22)	2	(18)	2	(29)
d. every 5 years	1	(6)	1	(9)	0	
e. no regular schedule	2	(12)	1	(9)	1	(13)
25. Does anyone check your blood pressure between doctor's visits?						
a. 4 times/year	12	(67)	8	(73)	4	(57)
b. 2 times/year	2	(11)	2	(18)	0	
c. 1 time/year	3	(17)	1	(9)	2	(29)
d. no regular schedule	1	(6)	0		1	(14)

Only 11 percent (2) patients surveyed in the total group had their blood pressure checked between doctor's visits. Both persons were in the noncompliant group

The final question's purpose was to allow persons to add any personal observations that might not have been covered during the interview.

26. Can you list any particular problems or obstacles which have made compliance with your medical regimen difficult?

Ten (56 percent) of the total group had no comment. Six persons stated weight control as their biggest problem. One person named family stress. One person stated their temper was still not controlled.

Compliance Scale

The scale allowed thirty (30) points for perfect compliance. Scores were assigned as follows:

Medication Compliance	-	10 points
Weight Control	-	5 points
Salt Restriction (do not use or substitute)	-	5 points
Cook with salt only	-	3 points
Add salt at the table and cook with it	-	0 points
Non-smoking	-	7 points
Non-drinking	-	3 points

Scores ranged from 18 points to 25 points for the compliant group. The average compliant score was 22 points. The average score for risk factors alone (excluding medication scores) was 12 points.

Scores ranged from 0 points to 25 points for the noncompliant group. The average noncompliant score was 12 points. The average score for risk factors alone was 9.2 points.

It was expected (hypothesized) that there would be a significant difference between the scores of the compliant and the noncompliant groups demonstrating the increased compliance to medical regimen of the compliant group. Accordingly, t-tests were performed comparing the means of their respective scores. (See Table 12 below.)

The results indicated a significant difference beyond the .01 level when medication habits of compliance was included. However, when only the risk factors (weight control, dietary salt restriction, cigarette smoking, and alcohol avoidance) were compared, there was no significant difference.

Table 12

Comparison of Means of Compliance Scores

	Compliant Group (N=11)	Non Compliant Group (N=7)	t	p
Medication Compliance and Risk Factors	22	12.0	3.23*	<.01
Risk Factors only	12	9.2	1.48**	>.05
*Significant beyond .01 level				
**Not Significant (p > .05)				

Summary

A non-experimental ex post facto study of hypertensive patients was conducted in a private physician's office. A knowledge test was developed and utilized to investigate knowledge of disease and medical regimen. Patients in the study were assigned to a compliant or noncompliant group according to self-report of medication habits and blood pressure readings recorded in the office for a three-year period. Each patient was interviewed by the nurse researcher to ascertain life style changes in relation to hypertensive risk factors including weight control, dietary salt restriction, and abstinence from cigarette smoking

and alcoholic beverages. Mean scores of the knowledge test of each group were compared and mean scores concerning compliance with medical regimen of each group were compared. The t-test was utilized. The findings of this study will be used to hopefully improve teaching of patients and result in increased patient compliance to medical regimen.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

A compliance study of patients with diagnoses of essential hypertension was conducted in the office of a private general practitioner. The purpose of the study was to: 1) determine compliance of patients with therapeutic regimen prescribed, 2) survey patient knowledge of disease and medical regimen, 3) investigate behavior modification patterns of patients in response to medical regimen, and 4) determine if a relationship exists between compliance to medical regimen and use of behavior modification techniques.

Summary

During a one-month period all patients visiting the physician's office with a diagnosis of essential hypertension were invited by the nurse researcher to participate in a compliance study. The study consisted of a written knowledge test and an oral interview with the patients concerning their efforts to comply with medical regimen. Eighteen patients meeting the criteria for the study chose to participate.

A tool for data collection was developed by the nurse researcher. It contained three sections: 1) A compliance section surveying patient self-report of medication habits and permission to review their medical records for blood pressure readings and weight recordings for the past three years, 2) A ten question knowledge test about hypertension and, 3) A twenty-five question oral interview about personal efforts to comply with medical regimen.

The tool was evaluated by a panel of physicians and professional nurses. A lay panel was utilized to ascertain that terminology was clear, and the survey could be completed in a reasonable length of time.

Patients in the study were assigned to a compliant or noncompliant group according to self-report of medication habits and office records of blood pressure readings. Each person completed a ten-question knowledge test about hypertension and their medical regimen. Mean scores of each group were compared.

Each patient was interviewed by the nurse researcher concerning life style changes they had made in relation to hypertension treatment. Each person was scored according to their stated compliance, and the means of each group's scores were compared. The t-test was utilized to compare the two groups.

Conclusions

1. Patient self-report of medication habits and office records of blood pressure readings were found to be invalid measures of compliance and noncompliance to medical regimen.

2. Patient knowledge of hypertension and understanding of therapeutic regimen did not necessarily increase compliance. There was no significant difference between the scores of the compliant and noncompliant groups. Both groups demonstrated correct knowledge about hypertension and good understanding of what they should do in relation to their therapeutic regimen.

3. Behavior modification patterns were identified only among compliant patients in relation to medication habits.

4. The only significant difference found between the compliant and noncompliant groups was medication compliance.

5. There was no significant difference found between the compliant and noncompliant groups in relation to hypertensive risk factors including weight control, dietary salt restriction, and abstinence from cigarette smoking and alcoholic beverage use.

6. It was not determined by this study if a relationship exists between compliance to medical regimen and use of behavior modification techniques.

The findings of this study were consistent with the findings of other similar studies reported in the review of literature. Knowledge of disease and medical regimen did not necessarily result in adherence to treatment. Patients had not made any dramatic life style changes in relation to this disease which was not currently perceived as a crisis or life-threatening situation. Behavior strategies had not been taught to these patients, and the only behavior modification patterns which could be identified were among compliant patients in relation to medication habits. Medication compliance required less life style change than other hypertensive risk factor problems and was the most successfully adhered to factor.

Implications

1. Behavior modification patterns identified in relation to medication habits which could be useful in increasing compliance included:

- a. Keep the medication bottle in the kitchen in plain sight or in a specially marked box or drawer.

- b. Take medication at the same time each day.
- c. Take medication at the same time of some other event which occurs each day such as: meal time, immediately after awakening in the morning and at bedtime, with morning coffee or juice, etc.
- d. If several medications are to be taken during the day, place them in a separate labeled bottle or container to designate that particular day's medicine.
- e. None of the patients in this study reported any form of written record keeping, and all stated they would prefer not to do so. Even though this method could be helpful this study indicated patients found it undesirable.
- f. If medication is to be carried in a purse or pocket, have a separate labeled container so that the prescription bottle is not lost or placed out of sight.

2. Behavior modification patterns identified among compliant patients in relation to medication habits indicated the possibility of the usefulness of utilizing behavioral strategies to increase compliance.

3. Poor compliance to hypertensive risk factors demonstrated by both the compliant and noncompliant groups indicated a need for improvement in the methods used to attain patients' adherence in these areas.

4. Lack of instruction concerning salt restriction in the diet reported by nearly all patients in the survey indicated a need for improved teaching by health care personnel in this area of compliance.

5. Many patients stated confusion concerning the multiple-choice questioning format used on the written knowledge test. An oral test in this area might have been more valid or a different type of written exam.

6. Poor compliance to hypertensive risk factors and the attitudes expressed by patients to the nurse researcher indicated apathy on the part of patients to be a major factor to overcome in increasing adherence to medical regimen.

Recommendations

Based on the results and implications of this investigation, the researcher has made the following recommendations:

1. Further investigations be made into non-invasive methods of measuring compliance.

2. Another similar study be conducted in a situation where patients are not responsible for expenses and use urine testing as a measure of compliance. Also, more numerous office treatments could be requested of patients.

3. Another study of compliance be conducted in this same office after teaching behavior strategies.

- a. Teach counting and self-observation techniques concerning weight control, smoking, and alcohol use.
- b. Teach home blood pressure recording.
- c. Instigate contingency contracting.
- d. Teach relaxation techniques to decrease stress, if desired.
- e. Improve oral instruction in the area of dietary salt restriction and give patients a written food list of sodium content of various foods.

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APPENDIX A

TOOLS

APPENDIX A. HYPERTENSION STUDY KNOWLEDGE SURVEY

Patient code _____

(circle the correct answer)

1. Symptoms of high blood pressure include:
 - a. headache, dizziness, and fainting spells
 - b. there are no symptoms
2. Blood pressure medication can:
 - a. cure high blood pressure
 - b. only control high blood pressure, and treatment is usually life long
3. Uncontrolled high blood pressure can increase your chance of having other health problems such as:
 - a. heart disease, strokes, kidney failure, and blindness
 - b. cancer, blood diseases, and liver disease
4. "Risk factors" which may increase your blood pressure and make control more difficult include:
 - a. over-eating and using excessive salt in your diet
 - b. smoking and alcohol
 - c. mental and emotional stress
 - d. all of the above
5. If you have been diagnosed as having high blood pressure, it is wise to have:
 - a. a complete physical exam to detect any other health problems
 - b. an EKG (heart tracing) and chest x-ray to detect any heart problems
 - c. an eye examination
 - d. laboratory blood test to detect any kidney problems
 - e. all of the above
6. The goal of your medical treatment is to:
 - a. make your B/P 120/80
 - b. control your B/P where the bottom (diastolic) reading is 90 or less

APPENDIX A. HYPERTENSION STUDY KNOWLEDGE SURVEY (cont.)

7. Which side effects of high blood pressure medication are abnormal and should be reported to your doctor?
 - a. Fatigue, frequency of urination, and decreased sexual drive
 - b. Skin rash, blurred vision, nausea, headaches, or feeling faint
8. To be effective high blood pressure medication must be taken:
 - a. each day as directed
 - b. only when you feel bad or like your pressure is up
9. If you have your blood pressure checked between your regular doctor's visit and find it is up, you should:
 - a. increase your medication
 - b. remember B/P changes during each day in response to stress and activity
 - c. consult your doctor if you feel in danger
 - d. b & c
10. Controlling high blood pressure with medication and diet can increase the length of your life and decrease your chance of having heart disease and other serious illness.
 - a. True
 - b. False

APPENDIX A. HYPERTENSION STUDY COMPLIANCE SURVEY

Patient code: _____

Weight today _____ B/P recording today _____

Do you believe that you have high blood pressure (hypertension) at this time?

- a. yes
- b. no

How often do you take your blood pressure medication?

- a. always as directed
- b. most of the time
- c. occasionally or only when you feel you need it
- d. have stopped taking medication

What do you believe is your ideal weight? _____

Ideal weight according to Metropolitan Life Insurance Company Standards: _____

What is your age? _____ What is your height? _____

How does your usual weight compare with your ideal weight?

- a. within 15 pounds of ideal
- b. more than 15 pounds above ideal
- c. weight changes frequently
- d. weight is 15 pounds or more below ideal

How often do you visit the doctor for blood pressure check-ups?

- a. 4 or more times a year
- b. 2 times a year
- c. 1 time each year
- d. no regular schedule

Past recordings of B/P and weight:

Date _____ B/P _____ Wt. _____

APPENDIX A. HYPERTENSION STUDY - INTERVIEW TO
INVESTIGATE LIFE STYLE CHANGES DUE TO
HYPERTENSION (BEHAVIOR MODIFICATION)

Patient code: _____

1. Which sources have provided you with information about high blood pressure?
 - a. doctors
 - b. nurses
 - c. pharmacists
 - d. TV & radio
 - e. magazines & newspapers
 - f. books
 - g. family & friends
 - h. other _____
2. What most strongly influences or persuades you to control high blood pressure?
 - a. advice of doctor or other medical persons
 - b. personal desire for health
 - c. urging of family & friends
 - d. fear of complications (illness resulting from uncontrolled blood pressure)
 - e. feeling bad
 - f. other _____

Medication

3. Where do you keep your blood pressure medication? (kitchen, bedroom, table, purse, etc)

4. What time during the day do you take your medication?

5. Do you take your medication at the same time each day?

6. Do you keep a record of taking your medication? _____
If yes, explain. _____
7. Does a friend or relative remind you to take your medicine? _____ If yes, explain. _____

APPENDIX A. (cont.)

8. Do you have any special method for remembering to take your medication? _____

Weight Control

9. Were you advised to control or lose weight as part of blood pressure control?
10. Explain measures you have taken to control your weight:
- Diet? _____
- Exercise? _____
- Other _____
11. Were you advised to restrict dietary salt as part of your blood pressure control?
12. Have you reduced salt in your diet?
13. How much salt do you presently use?
- a. cook with salt and add it to food at the table
 - b. cook with it only
 - c. use salt substitute
 - d. do not use salt

Smoking

14. Do you smoke?
15. Have you stopped or reduced smoking to help control your blood pressure?
If yes, explain. _____

Alcohol

16. Do you use alcohol?
17. Have you stopped or reduced alcohol use to help control blood pressure?
If yes, explain. _____

APPENDIX A. (cont.)

Stress

18. Have you been advised that mental and emotional stress and worry may influence high blood pressure?
19. Have you taken any steps to reduce the stress in your life?
20. Do you consider your present life style stressful?
If yes, explain. _____

Heredity

21. Do any of your close relatives have high blood pressure?
If yes, explain. _____
22. Have any of your close relatives had strokes or heart attacks?
If yes, explain. _____

Medical Monitoring

23. How often do you have complete physical examinations?
24. How often do you have your eyes examined?
25. Does anyone check your blood pressure between doctor's visits?

APPENDIX B

PERMISSION FOR THE STUDY

159
TEXAS WOMAN'S UNIVERSITY
DENTON, TEXAS 76204

THE GRADUATE SCHOOL

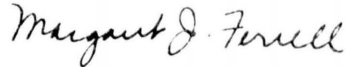
October 26, 1979

Mrs. Georgia A. Hale
5922 Thunder Drive
San Antonio, Texas 78238

Dear Mrs. Hale:

I have received and approved the Prospectus for your research project. Best wishes to you in the research and writing of your project.

Sincerely yours,



Margaret J. Ferrell
Acting Provost of the Graduate School

MF:d1

cc Mrs. Anna Burkhard
Dr. Anne Gudmundsen
Graduate Office

160
TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING
DENTON, TEXAS

DALLAS CENTER
1810 Inwood Road
Dallas, Texas 75235

HOUSTON CENTER
1130 M.D. Anderson Blvd.
Houston, Texas 77025

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE THOMAS P. SULLIVAN, M.D., P.A. PHYSICIAN IN GENERAL PRACTICE

GRANTS TO GEORGIA A. HALE

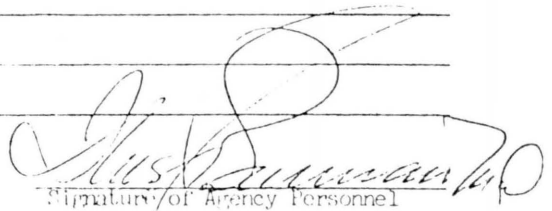
a student enrolled in a program of nursing leading to a Master's Degree at Texas Woman's University, the privilege of its facilities in order to study the following problem:

BEHAVIOR MODIFICATION AND COMPLIANCE OF
HYPERTENSIVE PATIENTS TO MEDICAL REGIMEN

The conditions mutually agreed upon are as follows:

1. The agency (may) (may not) be identified in the final report.
2. The names of consultative or administrative personnel in the agency (may) (may not) be identified in the final report.
3. The agency (wants) (does not want) a conference with the student when the report is completed.
4. The agency is (willing) (unwilling) to allow the completed report to be circulated through interlibrary loan.
5. Other _____

Date 7-13-79



Signature of Agency Personnel



Signature of student



Signature of Faculty Advisor

*Fill out and sign three copies to be distributed as follows: Original -- student; first copy -- agency; second copy -- T.W.U. College of Nursing.

161
TEXAS WOMAN'S UNIVERSITY
BOX 22487, TWU STATION
DENTON, TEXAS 76204

HUMAN RESEARCH REVIEW COMMITTEE

Name of Investigator: Georgia Hale Center: Denton
Address: 5922 Thunder Dr. Date: September 25, 1979
San Antonio, TX 78238

Dear Georgia Hale

Your study entitled Behavior Modification and Compliance of
Hypertensive Patients to Medical Regimen
has been reviewed by a committee of the Human Research Review Committee
and it appears to meet our requirements in regard to protection of the
individual's rights.

Please be reminded that both the University and the Department
of Health, Education and Welfare regulations require that written
consents must be obtained from all human subjects in your studies.
These forms must be kept on file by you.

Furthermore, should your project change, another review by
the Committee is required, according to DHEW regulations.

Sincerely,

Marilyn Henson

Chairman, Human Research
Review Committee
at Denton

PLEASE ADD TO INFORMED CONSENT FORM:

NO MEDICAL SERVICE OR COMPENSATION IS
PROVIDED TO SUBJECTS BY THE UNIVERSITY
AS A RESULT OF INJURY FROM PARTICIPATION
IN RESEARCH.