# SELECTED NURSING INTERVENTIONS FOR NONCOMPLIANT HYPERTENSIVE PATIENTS

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BY

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I am submitting herewith a dissertation written by Debra L. Austin entitled "Selected Nursing Interventions For Noncompliant Hypertensive Patients". I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Nursing.

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The purpose of this study was to assess the combined effect of self-monitoring of blood pressure and medication-taking behavior, tailoring medication administration to daily routines, increased supervision and reinforcement (self- and external) on medication compliance and blood pressure of noncompliant hypertensive black patients. The dependent variables were medication compliance and diastolic blood pressure, while the independent variable was the combination of selected nursing interventions.

The study was an experimental pretest-posttest control group design with random assignment to either the treatment or control group. Experimental subjects were visited in their homes biweekly for three visits over 4 weeks. Control subjects were visited in their homes at the beginning and end of the 4 weeks. During the second visit, control subjects were taught how to take their blood pressures and a tailoring plan for medication administration was developed, when needed.

The nonprobability sample consisted of 30 patients, recruited from nurse and physician referrals from a local hospital's outpatient clinic, two private physician practices, four senior citizen centers, and the community at large through two blood pressure screenings and subject referrals. The data were analyzed using analysis of covariance. Three null hypotheses were tested and failed to be rejected. Findings indicated no significant differences in medication compliance in terms of pills taken (hypothesis 1) and pills taken at prescribed intervals (hypothesis 2) and diastolic blood pressure (hypothesis 3) between the experimental and control group of noncompliant hypertensive patients. The experimental group's posttest medication compliance levels were greater than the control group's. Also, the experimental group's posttest diastolic blood pressure was lower than the control group's diastolic blood pressure.

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# CHAPTER I

## INTRODUCTION

Hypertension is one of the most prevalent chronic conditions known to increase the risk of developing circulatory diseases, particularly heart disease and stroke. Circulatory disease is the leading cause of death and hospitalization in the United states (Roland & Roberts, 1982).

Findings of a national survey conducted for the period 1976-1980 indicated that 14.5% or 16.5 million adults between the ages of 25 and 74 years had elevated systolic pressures of at least 160 mm Hg and/or diastolic pressures of at least 95 mm Hg. Twice as many blacks are affected as whites; more than 5 times as many blacks were found to have diastolic pressures over 115 mm Hg (U.S. Department of Health and Human Services, 1980).

Despite the gains made in hypertension control and reduction, noncompliance with antihypertensive medication is still a major problem and the most significant cause of failed therapy. The consequences of noncompliance are devastating physiologically, psychologically, and socioeconomically. An understanding of noncompliance is needed to reduce these effects. However, because of

complexity, research has not demonstrated any universally accepted determinants (Blackwell, 1976; Robbins, 1980; Sackett, 1978; Sackett & Haynes, 1976). As a result, Sackett (1978) stated that research efforts should be aimed at identifying strategies to improve compliance.

Compliance strategies fall into three broad categories: educational, behavioral, and a combination of these two combined. Educational approaches have been shown to achieve a success rate of 50%; combined, 75%; and behavioral, 82% (Haynes, 1976). Though the behavioral approaches have been tested least, they have demonstrated to be most effective.

Therefore, the following nursing interventions, which are primarily behaviorally-oriented, but include some educational facilitators were tested in this study: self-monitoring and self-reinforcement, tailoring, increased supervision and external reinforcement. Although each has been shown to be effective, empirical evidence of their combined effect is very limited in the literature. In addition, their efficaciousness in improving medication compliance and control of hypertension in blacks had not been tested.

Since the incidence of hypertension is greater in blacks than whites, significantly further reduction in

mortality from circulatory diseases might be achieved if medication noncompliance could be prevented and reduced in this population. There is a need to examine specific nursing approaches and their effectiveness in resolving this problem. The nursing interventions selected were behaviorally based with incorporation of educational principles. The study assessed the combined effect of self-monitoring of blood pressure and self-reinforcement, tailoring medication administration to daily routines, increased supervision and external reinforcement strategies in reducing medication noncompliance with the goal of achieving better blood pressure control in black hypertensive patients.

## Problem of Study

The study addressed the following problem:

Do the selected nursing interventions increase medication compliance and decrease the blood pressure of noncompliant hypertensive patients?

## Justification of Problem

The importance of the problem is substantiated by the incidence of hypertension, the potential seriousness of its consequences, the lack of universally accepted determinants of compliance, and the statistics of

noncompliance. There is a need to validate strategies which will resolve the problem of noncompliance.

Hypertension is a major health problem and risk factor known to cause heart disease, the leading cause of death in the United States. The black population is affected twice as often as whites and is more prone to the malignant type of hypertension. Since noncompliance plays an important role in the failure of treatment, efforts in this area might contribute significantly to cardiovascular morbidity and mortality reduction.

Compliance requires a person to change his/her lifestyle in some way. Whether adding or omitting a behavior, change for most people is difficult. Therefore, it is not alarming that studies indicate noncompliance to be approximately 50% (Foster & Kousch, 1981; Johnston, Kelly, & Dewitt, 1978; Roth & Caron, 1978). This statistic excludes those who have not entered the health care system.

The long-term implications of nonadherence are potentially devastating to the patient, family, and society. Medication noncompliance can result in unnecessary prolongation and/or development of complications and occurrence of illnesses or disabilities that might have otherwise been prevented. Uncontrolled

hypertension can cause strokes, kidney failure, congestive heart failure, and peripheral vascular disease, to name a few (Luckmann & Sorensen, 1982). These lead to over-utilization of health services, increase in readmissions, blocking of hospital beds, vast waste of unused expensive medication, abuse of health care providers' time, and feelings of frustration on the part of the patient, family, and providers. Assessed in terms of cost, the outcome necessitates increased expenditures for health care, insurance, Medicaid, and Medicare. Health care costs have dramatically impacted the economy in terms of inflation (Gill, Fairbrother, & Cullin, 1981; Falvo, 1981).

These can be prevented and/or reduced through interventions which deal with noncompliance. The outcome of care is dependent upon the patient's active participation and involvement in the decisions regarding treatment plans. Methodologies are needed that will enlist patient input. Most research related to interventions have focused on the following: patient education, convenience in follow-up and reminder methods, and fewer have tested contracting and patient groups with various combinations of these. Behavioral approaches have been examined empirically least of all. Also, the

literature has not demonstrated the effects of behavioral interventions in black noncompliant hypertensive patients.

These observations justify the need for this study. The potential usefulness of the findings could have a major impact upon the health care of black hypertensive clients.

## Theoretical Framework

The theoretical framework for the study was Bandura's (1969) social learning theory. Two problems in human learning are addressed: how new behaviors are acquired, and how they are regulated by internal and external forces. According to Bandura (1977), human behavior is a reciprocal interaction of personal and environmental factors including self-regulation. Since human behavior is explained from an integrative perspective, it provides a basis for the strategies selected to alter medication noncompliance of hypertensive patients. Thus, self-monitoring, tailoring, increased supervision, and reinforcement (self- and external) evolve from its principles and demonstrate its major concepts.

Bandura (1969) integrated behavioristic and cognitive approaches to explain behavior. Behaviorism focuses on external events, whereas cognitivism is concerned with internal processes or mediation, i.e., thoughts, feelings

memories, etc. Bandura (1969) emphasized that both are inevitably involved in most human behavior, and are attributed to three behavior-control systems: stimulus control, outcome control, and symbolic control.

Stimulus control involves those behaviors controlled by external stimuli (antecedent). They include reflexive or autonomic acts (e.g., sneezing, coughing, etc.), nonreflexive activity learned as a result of conditioning (e.g., sight of syringe causes anxiety and fear), and reinforcement (e.g., pain is associated with the syringe which reinforces the response).

Actions under the control of their consequences rather than stimuli are categorized as outcome control. This behavioral system relates specifically to those that become more probable as a result of reinforcement or less probable as a function of nonreinforcement or punishment. Behavior is regulated by its consequences.

Human activity influenced by mediation or internal processes is under symbolic control. Cognitive processes can direct behavior in several ways. Self-instructions or covert verbalization of rules and imagination of the projected consequences are approaches used by humans. Through the medium of symbols, people are able to solve problems by foreseeing the probable consequences of

different actions, without actually enacting all approaches, and alter their behavior accordingly. Without symbolization, reflexive thought would be impossible.

Through symbolic control, self-regulation and self-reinforcement or self-punishment occur. By arranging environmental inducements, generating cognitive supports, and producing consequences for their own actions, people exercise some control over their own behavior. Although self-regulatory processes are created and occasionally supported by external influences, self-influence partly determines which actions one performs (Bandura, 1977). Based on a criterion or standard of worthy performance, individuals evaluate themselves against the standard and selectively reinforce or punish themselves to maintain or modify their behavior themselves.

Even though the three classes are distinguishable theoretically, it appears that much human activity is probably the result of a combination of these three. Learning involves bringing responses under the control of stimuli, rewards/punishments, or symbolic processes. The type of behavior that one exhibits partly determines the environmental contingencies, which in turn influence behavior. Except for reflexes, people learn behavior

either by direct experience or by observation-imitation of a model.

Most human behavior is learned observationally through modeling or imitating a standard of performance. A model may be represented by any pattern of behavior--a person, books, verbal instructions, and multimedia. Learning via modeling is acquired mainly through symbolic control and governed by four major processes: (a) attending to and perceiving significant features of the modeled behavior, (b) retention or remembering what was observed, (c) motor reproduction or performing appropriate actions, and (d) motivational or receiving sufficient incentives (Bandura, 1977).

The principles by which behavior is governed can be utilized specifically to modify it. The nursing interventions selected can be conceptualized as empirical validations of varying behavior control systems. Each intervention illustrates how internal and external forces are utilized to change behavior.

Daily self-monitoring of blood pressure and medication administration demonstrates the predominance of modeling, symbolic control, and self-regulation. Learning the skill of blood pressure measurement requires modeling. Although primarily governed by reflexive

thought, without certain stimuli and consequences, acquisition of this skill may be impossible. Once learned, the knowledge gained from self-monitoring results in a self-evaluative process against the criteria for normal blood pressure and acceptable medication behavior. If the measurement is abnormal, one is motivated to change, and, if normal, it is reinforced through self-reward or self-praise provided that a normal blood pressure and its consequences have priority value.

Tailoring the patient's medication administration to his/her daily routine demonstrates stimulus control. Habits, rituals, and environmental clues serve as triggers of behavior; because of their association with medication-taking, they condition, stimulate, and remind the patient to take the medications.

Increased supervision and external reinforcement represent imitation and symbolic outcome, and stimulus control. Close monitoring by the researcher or any observer is an external force which can serve as a model and stimulator of compliant behavior. When monitored data are good or match the standard, one receives praise and acceptance from the observer. If these consequences have sufficient incentive value, the behavioral change is maintained through reinforcement internally

(self-reinforcement) and externally. Cognition plays a central role in this process.

Altering noncompliance through the use of techniques employing several systems of behavior control demonstrates the reciprocal interaction between personal and environmental factors of behavior as explained by Bandura's (1977) theory. Their efficacy is dependent upon inducing consequences of higher incentive value than the consequences of noncompliant behavior. The following proposition was tested in this study: If the immediate or anticipated consequences of a new behavior are perceived to be more desirable, more valuable, or less punitive than a previous behavior, then the newly acquired behavior will be governed by more than one source of behavioral regulation.

## Assumptions

The assumptions of the study were:

1. Increased compliance is a behavioral change. Internal and external factors contribute to the change in behavior (Bandura, 1969)

2. The antihypertensive medications prescribed were efficacious.

3. Medications were readily accessible.

4. Having been taught by the investigator, experimental subjects were skillful in taking their blood pressures themselves.

5. Blood pressure equipment was functioning accurately.

6. Subjects recorded accurate blood pressure measurements and pill counts.

## Hypotheses

The three null hypotheses tested in this study were:

1. With pretest measurement of medication compliance as determined by the percentage of pills taken according to the total number prescribed, there is no significant difference in posttest measurement of medication compliance between the experimental and control group of noncompliant hypertensive patients.

2. With pretest measurement of medication compliance as determined by the percentage of pills taken at the prescribed intervals according to the total number prescribed, there is no significant difference in posttest measurement of medication compliance between the experimental and control group of noncompliant hypertensive patients.

3. With pretest measurement of blood pressures, there is no significant difference in the posttest

measurements of diastolic blood pressures between the experimental and control group of noncompliant hypertensive patients.

## Definition of Terms

For purposes of this study; the following terms were defined:

1. Selected nursing interventions--

(a) Theoretical--techniques utilizing internal and external motivation forces to change behavior.

(b) Operational (independent variable)--(a) daily self-measurement and recording of blood pressure; (b) self-report of number of pills taken and omitted and number of pills not taken at prescribed times during the previous day; (c) biweekly follow-up visits by the investigator for evaluation, counseling, teaching as needed; (d) tailoring medications according to patient's habits or rituals; and (e) self- and external reinforcement.

2. Medication compliance--

(a) Theoretical--adherence to the medication regimen prescribed.

(b) Operational (dependent variable)--the percentage of pills taken according to total number prescribed and the percentage of pills taken at prescribed intervals as recorded and reported by the patient.

3. Blood pressure--

(a) Theoretical--measurement of the blood pressure by use of sphygmomanometer and stethoscope.

(b) Operational (dependent variable)--daily self-measurement and recording of systolic and diastolic blood pressure done according to the oral and written instructions of the investigator taken from Lancour (1976). Only diastolic pressures were used for pretest and posttest measurements.

4. Noncompliant hypertensive patients--

(a) Theoretical--adult patients who have not adhered to their medication regimen as prescribed by the physician and whose diastolic blood pressures may or may not be 90 mm Hg or above.

(b) Operational--nonhospitalized black male or female patients who are at least 18 years of age and report having omitted 20% or more of their total number of medications prescribed daily and/or missed taking 20% or more of their medications at the prescribed time and whose diastolic pressures may or may not be 90mm Hg or above.

## Limitations

The limitations of the study were:

1. Increased attention from the investigator might have influenced the subjects to change their behavior from the pretest to the posttest.

2. The study was limited to one small, homogeneous sample, which prohibited the generalizability of findings to other populations.

3. Sex, marital status, and socioeconomic status were not controlled.

4. Environmental and social circumstances of subjects were not controlled. These circumstances might have impacted blood pressure measurements and degree of medication compliance.

5. The short duration (4 weeks) of the study might have affected the findings and conclusions.

## Summary

Hypertension is a major contributor of cardiovascular disease, the leading cause of death in the United States. Its incidence in blacks is overwhelmingly higher than whites. Although recent studies demonstrate significantly better control of hypertension, which was attributed to antihypertensive medication, noncompliance with

antihypertensive medications is still a major factor in unsuccessful therapy.

Research has not demonstrated any universal determinants of noncompliance. Studies are needed to demonstrate the validity of specific approaches used to improve medication compliance. In addition, scientific evidence of compliance strategies has not been demonstrated in black noncompliant hypertensives.

As a result, the present study addressed this problem. The specified nursing interventions have been shown to be effective in improving medication compliance, although they have been tested least of all and no evidence of their effects in the black population has been demonstrated. Due to the nature of these approaches, Bandura's social learning theory provides a framework for understanding how these strategies effect behavioral change. The multifaceted nature of compliance behavior may be better understood by examining the factors that contribute to behavioral change. Although the limitations of the study inhibit its generalizability, these observations validate the significance of the problem and need for the study. Therefore, the effect of selected nursing interventions on medication compliance and blood

pressure in noncompliant hypertensive patients was examined.

# CHAPTER II

# REVIEW OF LITERATURE

The study examined the effect of selected nursing interventions on medication compliance and blood pressure of noncompliant hypertensive patients. Therefore, the literature cited is organized around the theoretical issues and/or empirical findings of the selected interventions being examined in the study and other nursing approaches tested for noncompliance. Literature relevant to self-monitoring is presented first, followed by tailoring; studies of the combined effects of self-monitoring, tailoring, and reinforcement techniques; and, finally, other nursing interventions for noncompliance.

## Self-Monitoring

Self-monitoring is the procedure by which individuals observe and record the occurrences of their own target behavior. It is used for data collection purposes, and under certain conditions, the process results in alterations in response frequency, called reactivity of self-monitoring (Nelson & Hayes, 1981).

The underlying mechanisms accounting for such reactivity have been proposed by several theories. Two

positions are presented because of their apparent congruency with the theoretical framework of the present study and their focus on different dimensions of self-regulation.

One explanation is offered by Kanfer (1970), who proposed a three stage model of self-regulation: self-monitoring, self-evaluation, and self-reinforcement. As a result of observing and recording the occurrence of one's behavior (self-monitoring), the individual compares the behavior with a standard of performance (self-regulation), and if it matches or exceeds the criterion, self-reinforcement occurs. Conversely, if the person's behavior fails to meet established norms, covert or overt self-punishment may occur. Self-monitoring triggers self-adjustive mechanisms. Thus, the major components of Kanfer's theory that differentiate it from others are: the reaction chain begins by self-monitoring and through self-evaluation, the self-monitored behavior increases or decreases in frequency as a function of self-administered consequences. He emphasized behavioral rather than environmental factors.

On the other hand, Nelson and Hayes (1981) proposed that reactivity is not solely the self-monitoring response itself, that external events (environmental) are also

involved. The entire self-monitoring procedure, including instructions from the therapist, training in self-monitoring, the self-monitoring device itself, comments by others about the device, the self-monitoring responses, if and when they occur, and other events contribute to self-adjustive behaviors. Self-monitoring cues environmental consequences which cause behavioral change. It accounts for data in which reactivity occurs despite inaccurate self-monitored data and an increase in unwanted target behaviors when self-monitoring devices are not used or when used, lack of reaching target behaviors cause an increase in unwanted behavior. This view also accounts for the effects of external monitoring produced in the same way as self-monitoring. Nelson and Hayes (1981) emphasized the reciprocal relationship of internal and external forces in producing self-monitoring reactivity and suggested that this extended view may increase the therapeutic impact of self-recording.

Despite the theoretical differences of reactivity in self-monitoring, studies have demonstrated the validity and reliability of self-monitoring's reactivity. The technique has been studied in education, sports, and as a therapeutic approach in health care, to name a few.

Johnson and White (1971) examined self-observation as a strategy for behavioral change. An experimental group of undergraduate students whose grades were compared with two control groups, was asked to observe and record their studying behavior for a college course. One self-observed dating activities; the other received no self-monitoring treatment. The experimental group achieved significantly higher grades than the control group with no self-monitoring treatment. Subjects in the self-observed dating group achieved higher grades than the non-treatment group and lower grades than the experimental subjects; however, the differences were not significant. Findings indicated that self-observation procedures may often be reactive and may be successfully used to alter behavior.

Kazdin (1974) performed three experiments to assess the reactive effect of self-monitoring. Experiment 1 evaluated the effect of social desirability and self-monitoring on a sentence construction task. Results indicated that self-monitoring determined the direction of the behavior change. Experiments 2 and 3, a replication of 2, examined the influence of providing a performance of a sentence construction task and compared the reactivity of self-monitoring and an external observer. Results indicated that self-monitoring or being monitored by

someone else were equally reactive, and providing a performance goal or feedback enhanced the reactive effects of self-monitoring.

Other motivational variables were studies by Lipinski, Black, Nelson, and Ciminero (1975) in relationship to their influence on the reactivity and reliability of self-recording. Three experiments were performed. In experiment 1, monetary rewards enhanced the reactive effects of self-monitoring even though the data remained inaccurate. In experiment 2, students received nonspecific feedback, verbal feedback, or verbal plus numerical feedback for the reliability of their self-recorded face touching. No differences in self-recorders' reliability were found among varying levels of feedback. Findings of the third study demonstrated that the self-monitored group were motivated to stop smoking and reported fewer cigarettes smoked than the group who used self-monitoring alone. These studies suggested that motivation of subjects and monetary reinforcement contingent of decreases in target behavior enhanced the reactive effects of self-monitoring.

Conversely, some motivational strategies added to self-observation did not yield significant differences as compared to self-monitoring alone (Greiner & Karoly,

1976). Neither training in self-monitoring alone nor self-monitoring plus self-reward techniques yielded significantly better performance than training in study methods alone. However, the group that received training in self-monitoring, self-reward, and planning strategies significantly out-performed other groups on most measures of study activity and academic performance. Thus, additional strategies utilized to increase the reactivity of self-observation should be carefully selected in terms of the type of behavior change aspired, the direction of the change, the recipients, and other relevant variables which might impact the results.

As shown in education, self-monitoring can affect positive outcomes in other fields. McKenzie and Rushall (1974), however, found the literature to be very limited in the use of operant psychology in physical education and sports. They recognized its potential for improving a swimming team's reported poor attendance and work rates. They conducted two studies, and the results demonstrated that self-monitoring of attendance and work rates publicly significantly improved and maintained the team members' attendance and evaluated their work rates by an average of 27.1%. Program boards facilitated self-recording of data.

Altering negative behavior with self-monitoring, like the swimming team's, has therapeutic implications in health care. Therefore, its use in health care is well established. Some of the target behaviors whose rates have been altered include depressive mood and inactivity, repetitive motor behavior, cigarette smoking, and obesity.

In a research study conducted by Harmon, Nelson, and Hayes (1980), self-monitoring of activity and mood were examined in a sample of depressed patients to determine if the number of reported pleasant activities would increase and if their depressed mood would decrease. Six depressed subjects were assigned to one of the following (two in each group): self-monitoring of activity, self-monitoring of mood, and control group. Although the small sample size imposes limitations of external validity, results demonstrated an increase in the number of self-reported pleasant activities and a decrease in depressed mood. Findings suggested that the reactive effects of both self-observed behaviors occurred because of the apparent relationship between mood and activity in depression.

Maletzky (1974) studied five cases of repetitive unwanted behaviors: a 52-year-old woman with a 30-year history of repetitive scratching resulting in arm and leg lesions, a 20-year-old woman with a life-long history of

fingernail biting to the point of tissue laceration, a 9-year-old boy who repeatedly raised his hand in class despite not knowing the answer, and a 65-year-old woman with a 12-year history of facial tics. Self-monitoring with a wrist counter with a gradually tapering schedule for counter wearing produced long-lasting remission of symptoms for all cases.

Forty chronic smokers were assigned to one of four groups in which self-monitoring of nicotine with and without health hazard information and self-monitoring of cigarettes with and without health information were the treatments manipulated (Abrams & Wilson, 1979). Significant decreases in smoking rates were reported for all groups with the two nicotine groups showing greater reactivity. There were no differences among groups as a function of exposure to health information attributing reactivity to self-monitoring alone.

Mahoney (1974) studied the effect of self-monitoring and self-reward for weight loss, self-monitoring and self-reward for habit improvement, self-monitoring alone, and delayed treatment control on weight loss in 49 obese adult volunteers. Although weight loss was not significantly different among the three experimental groups, the two self-reward groups showed substantial

weight loss improvements. Improvements were more pronounced for those who rewarded themselves for habit change rather than weight loss. Findings from this study indicated that reactivity was a function of the addition of self-reward than self-monitoring alone.

Similarly, self-reward strategies appeared to be superior to self-punitive and self-rewarding strategies in a study conducted by Mahoney, Moura, and Wade (1973). Obese subjects in the self-reward group lost significantly more weight than the self-monitoring, self-punishment, and control groups after 4 weeks of treatment and a 4-month follow-up.

Although self-monitoring has been shown to produce reactive behavior changes, it does not always do so. Zimmerman and Levitt (1975) found inconsistent results of the reactive effects of self-monitoring. Of the 22 patients who were asked to self-record by 14 different therapists, reactive changes occurred in only 8 who were under the direction of 7 different therapists. These findings suggested the impact of other variables as implied by Nelson and Hayes' (1981) theoretical view of the phenomenon: that the entire self-recording procedure, which includes both internal and external factors, contributes to reactivity.

## Tailoring

Tailoring is a set of interventions or actions designed and tailored to meet the goals of the provider as well as the patient (Fink, 1976). Because of the relationship established, it is as much a process as it is a set of tasks in which a consensus or mutual understanding is reached. According to Fink, a major assumption of tailoring is that the provider and patient recognize the capacity of the patient to be self-sufficient in solving health problems. Patients are treated as unique; therefore, it is not assumed that there is a standard regimen or uniform method of carrying out a regimen. Instead, the treatment plan must be individualized for each patient. The method selected must address the uniqueness of each situation.

Dunbar, Marshall, and Hovell (1977) identified the factors by which approaches are designed. Strategies may be tailored according to the unique characteristics and circumstances of the individuals. For example, an individual who is overweight and needs social support might benefit from a group like Weight Watchers. The nature of the problem might also require altering a standard treatment. For instance, certain methods used to help smokers to abstain are more effective when the

patient has actually stopped smoking rather than before. Another approach used is to adapt the plan according to the patient's personal habits and routines. The hypertensive patient who skips breakfast might be encouraged to take his/her medication before dinner or supper.

It is not clear at this time if there are certain types of patients who respond well to tailoring. Nevertheless, not all patients will benefit. Patients who value health and want to be compliant but find that their regimens are practically impossible are the most likely candidates for tailoring. Forgetful patients seem to benefit. This was demonstrated in a patient whose neurologist could not get the patient's seizures under control. Through counseling, the cause was attributable to circumstances which resulted in his forgetting to take his medications. Adjusting his medication-taking to his routine habits improved the situation drastically. Dilantin and phenobarb levels were above therapeutic levels 2 weeks after tailoring (Ozuna, 1981).

Although the literature is limited in studies of tailoring, the following investigations demonstrate its universal applicability. Other health disciplines have

studied characteristics of the patient or personality factors in relation to tailoring.

Psychotherapy has historically utilized specific approaches that would be expected to influence the smoothness and efficiency of the process. Likewise, smoking modification programs have attempted to demonstrate the efficacy of specific approaches for various personality types.

Best and Steffy (1971) examined the effects of dissonance internalized oriented approach to smoking control with an externalized environment-based approach to self-control. In other words, procedures were tailored to subjects' locus of control personality measures. They analyzed the relative worth of selected procedures for internal and external locus of control clients. Findings failed to show any predicted interaction between locus of control personality measure and treatment outcome, but the dissonance induction procedure produced significant differences. The data indicated that individuals with strong feelings of dissonance profit most from immediate orders to quit smoking. Those with a little sense of dissonance needed more time for treatment effects to build up dissonant feelings.

In contrast, Best (1974) found that tailoring smoking withdrawal procedures interacted significantly with locus of control characteristics. A factorial design assessed the efficacy of three procedures hypothesized to increase treatment durability as a function of client characteristics. The three procedures included treatment focus, punishment, and timing of attitude change. Two procedures were found to be effective for internal locus of control and external locus of control patients. Punishment involved satiating (smoking double preclinic rate) for postclinic smoking behavior. Timing of attitude change employed measures tailored to change attitudes, but introduced only after behavioral change occurred. If treatment is given too early or too late, its impact may be reduced. Treatment focus and timing of attitude change interacted significantly with client characteristics in determining treatment outcome. Six-month smoking abstinence was 31% in contrast to the typical 13%. These findings suggested the benefit of tailoring to individual differences.

In another smoking control program, personality characteristics were found to be amenable to certain methods used to break the smoking habit (Jacobs, Spilken, Norman, Wohlberg, & Knapp, 1971). They looked at low and

high risk subjects. High risk participants were defined as those who compulsively engage in self-administered frame of gratification, often because they are unwilling to be dependent on others. They are extremely self-reliant and because close ties to others have been repudiated, substances like tobacco are needed to control their experiences of tension, boredom, and irritation. Heavy smokers (minimum of a pack and average 35 cigarettes per day) who were low risk were more successful than high risk, when group rather than individual therapy was employed. Treatment without drugs was more effective for high risk cases than treatment with medication. The results of this study indicated a significant relationship between personality type and form of treatment as determinants of success in a smoking program.

These studies demonstrate that the success of a smoking program is dependent upon tailoring the appropriate treatment to the characteristics of the clients. In medicine, personality factors have not been examined in relation to tailoring methods. Use of patient routines, habits, and rituals as a basis for tailoring is more common. It is probably a practice of patients, although its prevalence has not been documented in the

literature. The following studies examined its effects on compliance.

Norell (1979) demonstrated increased compliance in a randomized clinical trial with 82 glaucoma patients. Subjects were shown a slide-tape program and given an educational leaflet about glaucoma. Individual attention was given and time tables of daily routines and habits were developed to tailor the medications according to their habits. The experimental group missed fewer doses and adhered to an 8-hour medication schedule.

Hallburg (1970) utilized a tailoring approach in her study, although she referred to it as a decision-making approach. Tailoring was used as a preventive strategy to reduce medication errors in older ambulatory patients. In a sample of 103 patients, Hallburg tailored their prescribed drug regimen to their routines, living patterns, abilities, and other unique characteristics. For example, one patient, who was on numerous drugs and felt he could not take more than one medication at a time, was instructed to take a pill an hour. Serious errors were made by 23.5% of the control group, but just 11.5% of the experimental group. Although differences between the groups were not significant statistically, the results suggested tailoring's practical importance.

Studies of tailoring validate its universality as well as its potential benefits. Its major deterrent is the difficulty in identifying the most appropriate match between the patient's characteristics or circumstance and treatment. The impact and lack of control of so many extraneous variables internally and externally can interfere with establishing the reliability of findings.

## Self-Monitoring, Tailoring, and External Reinforcement Strategies

Haynes et al. (1976) examined the effectiveness of behavioral strategies in a phase II investigation of Canadian steel workers. Thirty-eight hypertensive subjects who were noncompliant after a phase I educational program of mastery learning and convenient follow-up care were randomly assigned to an experimental or control group. The experimental subjects received the following treatment: self-monitoring of blood pressure, tailoring of medication administration to their daily routines, weekly follow-up visits, and monetary reinforcement. Rewards of praise and $4.00 credits toward ownership of the blood pressure equipment at each biweekly visit were given to those for increased compliance and blood pressure reduction. Increased compliance and decreased blood pressure were demonstrated in 80% of the

experimental as compared to 11% of the control subjects. However, researchers stated that findings may be attributable to increased attention. A major criticism of this study was the lack of reported results in forms of inferential statistical analyses. Whether there was a statistically significant difference between the two groups was not discussed.

The same researchers retested the specified strategies in another group of 140 patients to determine if increased attention significantly contributed to the increased compliance (Johnson et al., 1978). Patients were divided into four groups: (a) self-recording and monthly home visits, (b) self-recording only, (c) monthly home visits, and (d) no intervention. No significant difference in increased compliance and blood pressures among the four groups was demonstrated. The combined strategies examined were found to be helpful for patients who stated that they had difficulty remembering to take their medication.

### Other Nursing Interventions for Noncompliance

Although most of the literature addressed the issue of compliance within the domain of medicine, it is an important concept in nursing, also. Because nurses spend more time with patients than physicians, nurses have more

opportunity to observe and influence patients' health behavior. Noncompliance is the patient's response to the prescribed treatment regimen; thus, it falls within the realm of nursing and represents the response component of the nursing diagnostic statement (Resler, 1982).

Giblin (1978) stated that nurses can play a major role in controlling hypertension. Since nurses have contact with people in a variety of settings, they have opportunities to identify hypertensives who do not know they have the disease, intervene with noncompliant hypertensives, and assist in maintaining blood pressure control and reduction. In essence, nurses play a key role in detecting high blood pressure and evaluating the person's response to therapy, the first steps in controlling hypertension. An understanding of the contributing factors to noncompliance would enhance the nurse's ability to reduce and resolve compliance problems.

But the literature has not revealed any consistently valid and reliable data regarding the predictors of compliance nor any universally accepted interventions. Sackett and Haynes (1976) reviewed an incredibly large body of compliance literature, categorized the determinants of compliance behavior, and found many inconsistencies and contradictions.

Because of the complexity of noncompliance, Yoos (1981) suggested that there is a need to change the paternalistic climate of health care into one that promotes human freedom, understanding, and responsibility. The implication of paternalism being a major factor of noncompliance connotes ethical considerations and demonstrates, again, its complexity.

Daniels and Kochar (1980) addressed these philosophical considerations in their clinical experiences. They considered the multidimensional nature of noncompliance and in their practice with hypertensive patients, they developed and utilized an assessment and intervention model based on several theoretical frameworks, since it appears that no single theory fully explains or details strategies for compliance behavior. Their assessments and strategies were individualized with emphasis on establishing comfortable therapeutic relationships with patients and facilitating coordination with health team members, the patients and significant others to monitor and facilitate adherence. Since no statistical data were cited in this article, no conclusions could be made regarding the validity of this multidimensional approach. They did, however, suggest the need for nursing research in this area.

Similarly, Foster and Kousch (1978) and Ward, Bandy, and Fink (1978) emphasized assessment of patient's beliefs, feelings, learning needs, social support needs, and other factors which impact compliance. Assessment tools based on the health belief model, learning theory, and social support theory were developed by Foster and Kousch (1978). Several forms were used to collect and document data. Educational and counseling techniques were employed to promote patient compliance. Although the importance of their assessments was stressed, no empirical evidence was discussed. The following research studies examined the effect of education on noncompliance.

Powers and Wooldridge (1982) tested the relative effectiveness of four variations in the nurses' health teaching approaches on patient's knowledge, patient attainment of identified goals, and reduction of the patient's blood pressure. One hundred sixty subjects from five clinical settings participated. The four variations tested included: the number of meetings, the degree of emphasis on patient responsibility and participation, the directiveness of the nurse's intervention style, and the degree of emphasis on negative consequences of uncontrolled hypertension. While the general information about hypertension presented in the program was the same

for each patient, the context in which this information was presented was manipulated according to which of the 16 treatment combinations the patient was assigned. High indirect interventions (patient-oriented) tended to lead to higher goal attainment. Emphasis on negative consequences tended to promote learning for patients with long-standing diagnoses, but tended to retard learning for recently diagnosed patients. Additional meetings and emphasis on patient responsibility were not helpful alone, but in combination, they tended to lead to greater learning. Although as a whole, patients in the study tended to reduce their blood pressure, there were no statistical main effects or interaction effects of the educational variations on blood pressure reduction.

Tanner and Noury (1981) also found in their study that instruction increased the patients' knowledge of hypertension, but had no significant effect upon the control of the diastolic blood pressure. Of the 30 participants, 15 were randomly assigned to the control group and 15 were randomly assigned to the experimental group. Their knowledge about essential hypertension and diastolic blood pressures were measured before and after the structured teaching program developed by the investigator. Posttest scores on knowledge were

significantly higher in the experimental group than in the control group. But the experimental group's diastolic pressure was not significantly lower than the control group and did not fall below 90 mm Hg. The researchers acknowledged the tentativeness of their findings and explicitly addressed the study's limitations which prevented generalizing beyond the sample.

Another nursing intervention used to improve compliance is the reminder method. If patients drop out of treatment, they, too, become noncompliers. Lowther and Carter (1981) determined if sending missed appointment reminder cards would significantly increase the patients' rescheduling and keeping of their next appointments. Data were compared with a population of appointment breakers during the same period when no reminders were sent. Findings revealed a statistically significant increase in the number of appointment breakers who rescheduled an appointment after receiving a reminder card and in the number who returned after receiving a card. In addition, patients stated that the cards suggested increased concern by health providers, reinforced the seriousness of their illness and increased their self-esteem.

Contingency contracting is a newer approach to increasing compliance and is based on the principles of

reinforcement and extinction. Necessary elements of the desired behavior, mutually agreed upon, are written in measurable and realistic terms in a contract. Upon achievement of goals, the patient is rewarded for his behavior (Steckel & Swain, 1977; Zangari & Duffy, 1980). The following study examines and compares its effects with an educational approach.

In an experimental study of 115 randomly selected and assigned noncompliant hypertensive patients, contingency contracting was compared with patient education and routine clinic care (control) to determine their effect upon the subjects' knowledge about hypertension and its management, compliance with regular medical follow-up and blood pressure (Swain & Steckel, 1981). This study demonstrated a higher drop-out rate in the patient education group than in either the routine clinic care or contingency contracting group. Not only did the contingency contracting group have a significantly lower mean blood pressure, they demonstrated 100% adherence to contracts, had no drop-outs (18 month study with patients reporting every 6 months to the clinic), and all clients kept their appointments. The study suggests the potential benefits of contracting to improve compliance.

Studies of other nursing approaches for noncompliance illustrate the paucity of nursing research in the area of compliance as well as its complexity. The variations in definitions identified in the studies discussed give evidence of one among many factors contributing to its intricacy. In spite of the limited research documented, the approaches listed can be categorized into educational, behavioral, and combined. The lack of sufficient evidence does not reduce the importance of promoting compliance nor the role of nurses in this process. These observations only justify the need for more research on nursing compliance strategies.

## Summary

Studies of self-monitoring alone, self-monitoring with selected behavioral strategies, tailoring alone, tailoring with self-monitoring and selected motivational techniques, and other nursing interventions for noncompliance demonstrate positive outcomes, although results are not statistically consistent. Perhaps this is due to the lack of sufficient data relative to replications and weaknessess in the design. In addition, their effectiveness in black noncompliant hypertensive patients has not been documented. Since the addition of well-selected motivational approaches to self-monitoring

does appear to enhance reactive effects of change, more research on the selected nursing interventions is needed to determine their combined effect as a compliance improving strategy.

# CHAPTER III

## PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

The problem of the study was to determine the effect of selected nursing interventions on medication compliance and blood pressure of noncompliant hypertensive patients. The setting selected facilitated data collection, because of the high incidence of hypertension and the percentage of black hypertensive patients. Due to the nature of the study, several instruments were developed by the investigator and a small pilot study was conducted to assess the study's feasibility and adequacy of the procedure and instruments. A computer analysis was performed to test the three hypotheses identified. The following is a discussion of each component of the data collection process.

The present experimental study used the pretest-posttest control group design in which subjects were randomly assigned to an experimental or control group and pretested and posttested on blood pressure levels (dependent variable) and medication compliance (dependent variable). The treatment tested was a combination of selected nursing interventions (independent variable).

The control group was given the treatment at the end of the study.

According to Kerlinger (1973), designs with two randomized groups--experimental and control--are probably the best designs for many experimental purposes. Random assignment reduces the threats of internal validity.

## Setting

The setting of the study was an American southeastern city. The location was selected because of the high percentage of black clients (approximately 30%), and the incidence of hypertension in the state demonstrated to be 31% (Shepard, Wheeler, & Weinrich, 1984).

Data were collected in participants' homes. Subjects were visited in their homes by the investigator for three visits at a mutually agreed upon time during treatment application (experimental) and two visits for the control group. Subjects' homes provided environments which were more conducive to learning, encouraged their participation, and prevented subject mortality.

## Population and Sample

The target population was black adult hypertensive patients who were noncompliant with antihypertensive medications. The accessible population was outpatients of

a clinic, private physicians' practices, and selected community resources in a southeastern city. Subjects were at least 18 years of age or older and nonhospitalized.

A small nonprobability sample included 30 volunteers. Participants were recruited from nurse and physician referrals from one clinic of a 611-bed teaching hospital, two physicians in private practice, four senior citizen centers, and the community at large through two blood pressure screenings and subject referrals.

The sample was comprised of subjects who consented to participate voluntarily. Due to the nature and duration of the study, a small number of participants was recruited. Therefore, the lack of random selection and small sample size decreased the chance of producing a representative sample. However, use of volunteers did prevent subject mortality. No one terminated their participation prematurely.

Random assignment to groups was employed to prevent bias and promote equalization between the experimental and control group (Kerlinger, 1973). Participants were assigned to one of two groups at random. Arbitrary assignment of numbers 1 to 30 were given to participants and using a table of random numbers, each subject was alternately assigned to the experimental or control group

based on assigned number. There were 15 subjects in each group.

## Protection of Human Subjects

Permission to conduct the study was obtained from Texas Woman's University Human Subjects Research Review Committee and the Graduate School (Appendix A). Upon their approval, the agency's (Appendix B) and private physician's consent were obtained to conduct the study.

Potential participants were initially contacted by telephone by their physicians or approached during their follow-up visits for approval to release their names to the investigator. Permission was obtained from specified agency directors to conduct blood pressure screenings. Subsequently, identified potential subjects were assessed in terms of meeting the criteria and those who met the criteria were oriented by the investigator to the study, its purpose, potential risks, and protection of their rights (Appendix C).

Code numbers rather than names were used on data collection forms. Confidentiality of information was honored. Subjects were assured of their rights to refuse or terminate at any time. Their treatment as patients was

not affected regardless of their decision. The informed consent form (Appendix D) included this information.

## Instruments

Instruments used for data collection were: blood pressure equipment; Demographic Data Form (Appendix E); Medication Form (Appendix F); Tailoring Form (Appendix G); and Summary of Visit Instrument (Appendix H). Instruments that required completion for assessment data were used as interview guides and completed by the investigator to facilitate speed of the data collection process.

### Blood Pressure Equipment

The portable aneroid sphygmomanometer and stethoscope were used to obtain blood pressure readings. Use of this equipment necessitated the indirect approach. Although not as accurate as the direct method, the invasive approach, the indirect method was simpler, more practical, and safer for self-recordings (Lancour, 1976).

Lancour (1976) stated that different results obtained by the indirect approach in comparison to the direct means are to some extent related to errors of instrumentation or technique in the use of the sphygmomanometer. Faulty technique is probably responsible for most errors. To control for errors in instrumentation, thereby increasing

its reliability, new blood pressure sets were purchased from a reputable pharmacy. All sphygmomanometers were checked for accuracy and need for repairs and/or replacement. To control for errors of technique, thereby increasing their validity, measurements of blood pressures and teaching were done only by the investigator. Simple instructions were given orally and in writing (Appendix I). An enlarged drawing of the blood pressure gauge supplemented instructions to facilitate one's understanding of how to read a gauge (Appendix J). Principles of blood pressure measurements were taken from Lancour (1976). To promote accuracy and consistency in diastolic readings, they were read at the level where the sound ceased (fifth phase). The fourth phase or change from loud to muffled sounds is more difficult to assess, which might have presented a problem to older clients. Therefore, they were not taught to read the diastolic pressure at the fourth phase.

When working properly, both the aneroid and mercury manometer systems give accurate results (Lancour, 1976). However, due to the difficulty imposed by self-measurement and cost of mercury types, the aneroid was more practical for this study.

## Demographic Data Form

The Demographic Data Form (DDF) was developed by the investigator and used to elicit vital, social, and medical data. Content validity was established by a panel of 10 doctoral nursing students. The DDF included identification codes, address, sex, age, marital status, education, duration of hypertension, other relevant disorders, belief in the seriousness of hypertension, and pretest blood pressure measurements for the right and left arms. The mean of the two diastolic readings was used as the pretest score for blood pressure level.

## Medication Form

The Medication Form (MF) was developed by the investigator to obtain data regarding the patient's medications and his/her behavior in medication administration. Content validity was established by a panel of 10 doctoral nursing students. Pretest measurement of their medication compliance behavior was assessed for the previous 7 days rather than 1 day to obtain a more typical description of the subjects' medication behavior. Compliance was determined by the percentage of pills taken and the percentage of pills taken at the prescribed intervals during the previous 7

days. To facilitate recall, thus increasing the accuracy of such data, subjects were asked to report the number of days they complied with doctor's orders in terms of the number of pills taken at prescribed intervals. Then, they were asked about the pills omitted and missed on the day(s) they had not complied with doctor's orders. Other information collected included rationale for noncompliance, belief in the efficacy of antihypertensive medication, and a list and total number of medications prescribed daily and weekly.

## Blood Pressure and Pill Data Collection Instrument

The Blood Pressure and Pill Data Collection Instrument (BPPDCI) is shown in Appendix K. The researcher designed it to facilitate experimental patients' self-recordings of numerical data and a graph of daily systolic and diastolic blood pressures as well as the number of pills taken, omitted, and missed taken at prescribed time (took pill, but took at the wrong time or interval). A heavier line at the 90 mm Hg level reinforced at-goal or not-at-goal diastolic readings. The graph gave a visual pattern or trend of readings for a 2-week period (14 daily measurements) at a glance. Patients could see a relationship between pills taken,

omitted, missed, and level of pressure. These observations increased the subject's awareness of the problem or its potential for resolution and emphasized his/her ability to control or resolve the problem.

Posttest measurements of diastolic blood pressures, pills omitted, and pills missed were obtained from the last 7 days of recordings (i.e., 4th week). The last seven diastolic blood pressure readings for each subject were averaged. The mean was used for data analysis to test hypothesis #3. Each of the sums of the pills omitted and pills missed for the last 7 days was subtracted from the total number of pills prescribed per week to obtain the actual number taken according to doctor's orders. The actual number taken was divided by the total number of pills prescribed to obtain the percentage of pills taken (hypothesis #1) and the percentage of pills taken at prescribed times or intervals (hypothesis #2). Percentages were converted to decimals for computer analyses. Seven days of posttest readings rather than one were used to demonstrate a more typical pattern of the subject's compliance behavior.

## Summary of Visit Instrument

The Summary of Visit Instrument (SVI) was designed and developed by the investigator to document observations

of the participants' behavior and responses to nursing interventions implemented. Such data helped to explain factors underlying behavior. Subheadings (i.e., blood pressure, medication behavior, self-reinforcement, external reinforcement, other observations, and interventions implemented) promoted consistency and comprehensiveness of progress notes.

## Data Collection

Experimental subjects were visited in their homes for three visits during a 4-week period. Home visits rather than office or clinic appointments were done to encourage subjects' participation and reduce the loss of subjects. On-site sessions also gave additional data that enhanced individualizing the treatment protocol. The visits promoted more consistency of the effects of environmental factors on blood pressure readings. Differences in the readings between the home and clinic or office would be minimized.

Family members were included in the sessions. Several spouses and children were taught how to take blood pressures. The involvement of family members was another external factor of reinforcement.

The first session was devoted to the collection of pretest and demographic data, medication-taking behavior,

and the participant's daily habits, orientation and/or training in blood pressure measurement and recording, and signing of consent forms. The patient's blood pressure was taken in the right and left arms with the subject sitting. Two biweekly (every 2 weeks) follow-up visits were made for evaluative purposes and posttest measurements. Observations were recorded on the SVI as soon after each visit as possible. Some notes were made during the sessions.

Participants assigned to the experimental group received the following protocol.

1. Home self-measurement of blood pressure--each patient was loaned an aneroid sphygmomanometer and stethoscope and instructed in their use in the first session. Written and oral instructions followed by demonstration by the investigator and return demonstrations were employed. Patients were given sufficient time to practice on themselves and the investigator. The time needed varied with the needs of the subject. Readings within 5 mm Hg of the investigator's were accepted as evidence of skill in taking a blood pressure.

2. Home blood pressure and medication charting --daily pill and blood pressure charts (BPPDCI) were

issued to participants. They were instructed to record his/her first (systolic) and fifth phase (diastolic) blood pressure each day and the number of pills taken, omitted, and missed during the previous. They were taught to take their pressures at the same time every day after resting for at least 10 minutes. The goal of the fifth phase blood pressure below 90 mm Hg was emphasized.

3. Tailoring--during the first visit, each participant was interviewed regarding daily habits or rituals. If they acknowledged having omitted or missed taking their medications because of a frequent loss of memory, the resulting pattern of habits was compared with the patient's antihypertensive regimen and when the two coincided, the patient was advised to take pills immediately before executing the habit or ritual. Patients were encouraged to place their drugs at sites of rituals or other places that the client and investigator believed to be more appropriate or effective. Only 5 experimental subjects needed tailoring. They attributed their forgetting to take their drugs to busy schedules and frequent changes in activities.

4. Increased supervision and reinforcement--patients were visited in their homes biweekly for a review of their daily pill and blood pressure charts and a check of their

blood pressures. The patient was requested to take his/her blood pressure followed by the investigator to evaluate one's performance and correct any problems of technique and offer praise for good performance. If the blood pressure was either less than 90 mm Hg or less than previous visit and/or demonstrated a daily 90-100% compliance, he/she was praised. If 90-100% compliance was observed during the final week on a daily basis, the subject was rewarded with the blood pressure kit. They were reminded of this reward at subsequent visits. Self-reward was encouraged. Subjects selected for themselves whatever they felt constituted a reward. If neither occurred, the reasons or underlying factors were sought. Possible problems and alternative approaches were identified. He/she was encouraged to do better the next interval. Subjects who demonstrated 100% compliance without any appreciable diastolic reduction were advised to discuss the situation with their physicians.

Control subjects were visited in their homes at the beginning and end of the study for pretest and posttest measurement and recording of blood pressures and compliance behavior by the investigator. Discussion of problems initiated by the patient was incorporated. At

the end of the study, control subjects received the treatment protocol.

Actual data collection was done from January to July, 1985. The duration of the study for each participant was 4 weeks. The average length of time spent with patients during the first session was about 1 hour and 15 minutes for experimental subjects and 30 minutes for control participants. Duration of subsequent visits for evaluative purposes was approximately 30 minutes. About 1 hour was spent with control participants during the second (last) visit. Sessions were scheduled at a time mutually agreed upon by the client and the investigator. Most were held in the evening after 4:00 p.m.

To prevent contamination between groups, patients were cautioned not to discuss their activities with other subjects they knew were participating. It was felt that control subjects' knowledge of the experimental group's activities might influence their participation in the study. Although control subjects were informed that their treatment would be given during the second visit, their knowledge of its delay and no opportunity for reward of blood pressure equipment could have been perceived as discriminating. Recruitment from several sources reduced the probability of several friends participating.

Patients from the same agency were usually seen during the same time period.

## Pilot Study

A pilot study was conducted during the spring of 1984 in a southwestern city for the purpose of assessing its feasibility and adequacy of the procedure and instruments. Information gained indicated the need for employing different recruitment approaches, revising the instruments and written instructions for taking the blood pressure, and expanding the duration of the study from 2 to 4 weeks.

Initially, the recruitment of potential subjects was limited to the private practice of one interested physician. Due to the lack of this physician's cooperation in contacting potential volunteers, the first recruitment effort was totally unsuccessful. Subsequently, subjects were recruited from a small community church with a predominantly black membership. Although the response was very positive, only three met most of the criteria. Thus, the criteria for inclusion of subjects were revised to be less restrictive to increase the sample size and feasibility for conducting the study. Thus, subjects were recruited from several sources, such as outpatient clinics, several private physicians'

practices, senior citizen centers, and other local community groups with a predominantly black membership. The city in which this study was conducted has a 30% black population with a high incidence of hypertension and other cardiovascular disorders, thus increasing the probability of a larger sample size.

Evidence also indicated a need for revisions in the data gathering tools. The original Demographic Data Form incorporated questions regarding demographics as well as questions related to medications, daily habits, and tailoring. Related statements for each area were organized into additional instruments to facilitate data collection and promote clarity. The revised Demographic Data Form elicited vital, social, and medical data which appeared to be more useful at the interval level of measurement than the ordinal level. New tools developed by the investigator include the Medication Form, Tailoring Form, and Summary of Visit Instrument. Outcomes of the pilot study indicated the need for additional questions related to noncompliance, which gave a more comprehensive baseline measurement of the patient's medication. The original Blood Pressure and Pill Data Collection Instrument was altered to improve its visual appeal and

facilitate recording of data. Its revision was especially helpful to participants with visual deficits.

Although pilot subjects stated that the written instructions for Taking Your Blood Pressure were very adequate, one person suggested the addition of a large drawing of the gauge on the sphygmomanometer (Appendix J). The drawing promoted more accurate interpretations by familiarizing one with the calibrations on the gauge. The sketch was attached to the Instructions for Taking Your Blood Pressure.

The small sample size (three subjects) and short duration (2 weeks) were recognized as major limitations of the pilot, although the purpose was primarily for procedural and instrument evaluation rather than testing for statistical significance of the treatment. Outcome adjustments reduced these threats and promoted meeting the assumptions of inferential statistics.

## Treatment of Data

Data were analyzed using analysis of covariance (ANCOVA) with the significance level set at .05. Two measures of compliance level (i.e. pills taken and pills taken at prescribed intervals) and mean diastolic blood pressure measurements were statistically analyzed, using the computer program, Statistical Analysis System (SAS).

Pretest measurements of medication compliance and diastolic blood pressure readings were used as covariates. Although subjects were randomly assigned to groups, the lack of random selection may have enhanced the nonprobability of the sample and pretest differences between the experimental and control group. The ANCOVA analyzes the final measures for significance, but the analysis is adjusted for pretest differences between groups (Kerlinger, 1973). With 2 and 27 degrees of freedom, an $F = 3.35$ was needed to reject the null hypotheses at the .05 level of significance.

# CHAPTER IV

## ANALYSIS OF DATA

The study examined the combined effect of self-monitoring of blood pressure and medication-taking behavior, tailoring medication administration to daily routines, increased supervision, and reinforcement (self- and external) on medication compliance and blood pressure of noncompliant hypertensive patients. A description of the sample and results of the statistical analyses for each hypothesis are presented.

### Description of Sample

Eighty patients were referred by physicians, nurses, agency directors, and other subjects as possible research participants. Thirty-seven (46%) met the criteria established. The investigator was unable to reach 11 (14%) persons, while 32 (40%) did not meet criteria because of their self-report of 100% compliance, while acknowledging frequent readings of high blood pressure measurements. Of the 37 potential subjects contacted, who met the criteria, 7 (23%) refused to participate and 30 (77%) consented voluntarily. Table 1 gives an analysis of

Table 1

Subject Numbers by Sources

| Sources | Number of subjects | Percent |
|---|---|---|
| One outpatient hospital clinic | 10 | 33 |
| Two private physicians' practices | 7 | 23 |
| Four senior citizen centers (blood pressure screenings) | 5 | 17 |
| Community at large (2 blood pressure screenings at grocery store; subject referrals) | 8 | 27 |
| Total | 30 | 100 |

the number of subjects included in the sample from specified sources used.

The sample of 30 participants consisted of persons who consented to participate voluntarily. Due to the nature and duration of the study, a small sample was obtained. Therefore, the lack of random selection and small sample size decreased the probability of producing a representative sample. However, use of volunteers did prevent subject mortality. No one terminated their participation prematurely.

The sample included 17 (57%) females and 13 (43%) males. Ages ranged from 31 to 78 years old with a mean of 54.5. Three (10%) were single; 14 (47%) were married; 3 (10%) were divorced: 1 (3%) was separated; and 9 (30%) were widowed. Education of subjects ranged from 3 to 17 years with a mean of 10.6 years. Range of hypertension duration was 1 to 42 years with a mean of 11 years. The total number of antihypertensive medications prescribed ranged from 1 to 3 with a mean of 1.7. The total number of pills prescribed daily ranged from 1 to 10 with a mean of 3.1. Reasons given for medication noncompliance and the number of patients acknowledging them are presented in Table 2. Diabetes was the most frequently reported chronic illness (30%). Twenty participants (67%) were

Table 2

Reported Reasons for Medication Noncompliance by Group

| Reasons | Control | Experimental | Total group | Percent |
|---|---|---|---|---|
| Intolerable side effects | 6 | 5 | 11 | 30 |
| Forgetting | 5 | 5 | 10 | 27 |
| Non-refill of prescription (non financially related) | 4 | 5 | 9 | 25 |
| Lack of belief in doctor's diagnosis | 1 | 1 | 2 | 6 |
| Lack of perceived efficacy of medication | 2 | 0 | 2 | 6 |
| Inconvenient follow-up appointment time | 0 | 1 | 1 | 3 |
| Knowledge deficit in correct administration | 1 | 0 | 1 | 3 |
| Total | 19 | 17 | 36 | 100 |

overweight, of which 14 (70%) were females and 6 (30%) were males. Table 3 gives a comparative analysis of sample characteristics of the total, control, and experimental group.

## Findings

All data were analyzed using analysis of covariance (ANCOVA) at .05 level of significance. Subjects were not randomly selected, but were randomly assigned to one of two groups. As a result, the pretest scores for the two groups were not equivalent and the ANCOVA was used to adjust for differences between groups. The adjusted mean scores for the two groups were compared to determine the effects of the selected nursing interventions on medication compliance and blood pressure of the subjects. Results are presented for the three null hypotheses tested.

### Hypothesis 1

Hypothesis 1 stated: With pretest measurement of medication compliance as determined by the percentage of pills taken according to the total number prescribed, there is no significant difference in posttest measurement of medication compliance between the experimental and control group of noncompliant hypertensive patients. Findings failed to reject hypothesis 1. ANCOVA revealed

Table 3

Comparison of Sample Characteristics by Group

| Characteristics | Total Group | Control Group | Experimental Group |
|---|---|---|---|
| Number | 30 | 15 | 15 |
| Age ($\bar{X}$ in years) | 54.5 | 60 | 50 |
| Gender (Male/Female) | 13/17 | 8/7 | 5/10 |
| Marital status (%) | | | |
| single | 10 | 7 | 13 |
| married | 47 | 40 | 53 |
| divorced | 10 | 13 | 7 |
| separated | 3 | 0 | 7 |
| Education ($\bar{X}$ in years) | 10.6 | 9 | 11 |
| Hypertension duration ($\bar{X}$ in years) | 11 | 9 | 9 |
| Belief in seriousness of hypertension (%) | | | |
| yes | 100 | 100 | 100 |
| no | 0 | 0 | 0 |
| uncertain | 0 | 0 | 0 |
| Belief in effacacy of anti-hypertension medication (%) | | | |
| yes | 90 | 100 | 100 |

(table continues)

| Characteristics | Total Group | Control Group | Experimental Group |
|---|---|---|---|
| no | 7 | 0 | 0 |
| uncertain | 3 | 0 | 0 |
| Number of anti-hypertensive medications ($\bar{X}$) | 1.7 | 1.7 | 1.7 |
| Other chronic diseases (%) | | | |
| diabetes | 30 | 33 | 27 |
| heart trouble | 13 | 20 | 7 |
| stroke | 17 | 20 | 13 |
| kidney disorder | 10 | 7 | 13 |
| gallbladder disorder | 3 | 7 | 0 |
| others | 17 | 33 | 0 |

no statistically significant difference in the posttest medication compliance percentage of pills taken between the experimental and control group ($F$ .05 = 2.07, $df$ = 2,27, $p$ >.05). Results are presented in Table 4.

Pre- and posttest medication compliance levels for control and experimental groups are presented in Table 5. Percentage differences between pre- and posttest measurements are listed for the two groups.

## Hypothesis 2

Hypothesis 2 stated: With pretest measurement of medication compliance as determined by the percentage of pills taken at the prescribed intervals according to the total number prescribed, there is no significant difference in the posttest measurement of medication compliance between the experimental and control group of noncompliant hypertensive patients. Findings failed to reject hypothesis 2. ANCOVA revealed no statistically significant difference in the posttest medication compliance percentage of pills taken at the prescribed intervals between the experimental and control group ($F$ .05 = 2.06, $df$ = 2,27, $p$ > .05). A presentation of findings is given in Table 6.

Pre- and posttest medication compliance levels of pills taken at prescribed intervals for control and

Table 4

Analysis of Covariance for Medication Compliance According to Pills Taken by Group

| Source | SS | DF | MS | F | P |
|---|---|---|---|---|---|
| Covariate (precompliance) | 0.9849 | 1 | 0.9849 | 8.02 | .0086 |
| Group | 0.2538 | 1 | 0.2538 | 2.07 | .1621 |
| Error | 3.3167 | 27 | 0.1228 | -- | -- |
| Total | 4.5554 | 29 | -- | -- | -- |

$F_{.05}(2,27) = 3.35$

Table 5

Pretest and Posttest Medication Compliance Percentages

According to Number Prescribed by Group

| Group | N | Pretest Raw score | Pretest SD | Pretest % | Posttest Raw score | Posttest SD | Posttest % | Adjusted M | Raw score difference | % |
|---|---|---|---|---|---|---|---|---|---|---|
| Control | 15 | .42 | .31 | 42 | .63 | .43 | 63 | .59 | .17↑ | 41↑ |
| Treatment | 15 | .30 | .34 | 30 | .74 | .36 | 74 | .78 | .48↑ | 160↑ |

Table 6

Analysis of Covariance for Medication Compliance According to Pills Taken at Prescribed Intervals by Group

| Source | SS | DF | MS | F | P |
|---|---|---|---|---|---|
| Covariance (precompliance intervals) | 0.8720 | 1 | 0.8720 | 7.01 | 0.0080 |
| Group | 0.2567 | 1 | 0.2567 | 2.06 | 0.1623 |
| Error | 3.3580 | 27 | 0.1244 | -- | -- |
| Total | 4.4867 | 29 | -- | -- | -- |

$F$ .05 (2,27) = 3.35

experimental groups are presented in Table 7. Percentage differences between pre- and posttest scores for the two groups are listed, also.

## Hypothesis 3

Hypothesis 3 stated: With pretest measurement of blood pressure, there is no significant difference in the posttest measurement of diastolic blood pressures between the experimental and control group of noncompliant hypertensive patients. Findings failed to reject hypothesis 3. There was no statistically significant difference in the posttest measurement of diastolic blood pressures between the two groups ($F$ .05 = 2.07, $df$ = 2,27, $p$ >.05). Findings are shown in Table 8.

A comparison of the pre- and posttest mean diastolic blood pressures is depicted in Table 9. In addition, percentage differences between pre- and posttest measurements for the two groups are identified.

## Summary of Findings

The findings are summarized below.

1. There was no significant difference in percentage of prescribed pills taken between the experimental and control group of non-compliant hypertensive patients after treatment.

Table 7

Pretest and Posttest Medication Compliance Percentages According to Pills Taken at Prescribed Intervals by Group

| Group | N | Pretest Raw score | Pretest SD | Pretest % | Posttest Raw score | Posttest SD | Posttest % | Adjusted M | Raw score difference | % |
|---|---|---|---|---|---|---|---|---|---|---|
| Control | 15 | .38 | .26 | 38 | .62 | .43 | 62 | .59 | .21↑ | 55↑ |
| Treatment | 15 | .28 | .31 | 28 | .74 | .36 | 74 | .78 | .50↑ | 179↑ |

Table 8

Analysis of Covariance for Diastolic Blood Pressure by Group

| Source | SS | DF | MS | F | P |
|---|---|---|---|---|---|
| Covariate (prediastolic) | 1119.4086 | 1 | 1119.4086 | 5.30 | 0.0293 |
| Group | 437.0687 | 1 | 437.0687 | 2.07 | 0.1619 |
| Error | 5706.9893 | 27 | 211.3699 | -- | -- |
| Total | 7263.4666 | 29 | -- | -- | -- |

$F_{.05}(2,27) = 3.35$

Table 9

Pretest and Posttest Diastolic Blood Pressures by Group

| Group | N | Pretest M | Pretest SD | Posttest M | Posttest SD | Adjusted M | Raw score difference | % |
|---|---|---|---|---|---|---|---|---|
| Control | 15 | 101 | 15.9 | 92 | 14.7 | 92 | 9 mmHg↓ | 10↓ |
| Treatment | 15 | 100 | 14.0 | 84 | 16.4 | 84 | 16 mmHg↓ | 19↓ |

2. There was no significant difference in percentage of pills taken at prescribed intervals between the experimental and control group of non-compliant hypertensive patients after treatment.

3. There was no significant difference in diastolic blood pressure measurements between the experimental and control group of non-compliant hypertensive patients after treatment.

4. Although 100% believed that hypertension was a potentially serious disease, only 90% believed that their antihypertensive medications were effective in controlling high blood pressure.

5. Self-report of medication compliance levels ranged from 0 to 80%.

6. The average number of antihypertensive medications prescribed was 1.7, while the mean number of pills prescribed daily was 3.1.

7. Most frequently reported reasons for noncompliance were intolerable side effects, forgetting, and non-refill of prescriptions unrelated to finances.

# CHAPTER V

## SUMMARY OF THE STUDY

The study addressed the problem which stated: Do the selected nursing interventions increase medication compliance and decrease the blood pressure of noncompliant hypertensive patients? The problem, therefore, was to determine the combined effect of self-monitoring of blood pressure and medication-taking behavior, tailoring medication administration to daily routines, increased supervision, and reinforcement (self- and external) on medication compliance and blood pressure of noncompliant hypertensive patients.

In reviewing the literature, research evidence of the combined effect of these nursing approaches was very limited nor had any findings been documented for the black population, in spite of the morbidity of hypertension in this population. The lack of universal determinants of compliance and few empirical evidence of these nursing interventions for noncompliance validate the importance of this problem and need for the study. As a result, three null hypotheses were tested. Findings of these hypotheses are discussed in terms of the data collection process, theoretical and empirical interpretations, and

implications for nursing practice, nursing education, and further research.

## Summary

The sample used in the study consisted of 30 (77%) of an accessible population of 37 black hypertensive patients who were at least 18 years of age and reported an 80% or less medication compliance level, while 7 (23%) potential subjects refused to participate. Subjects were randomly assigned to either the control or experimental group using a table of random numbers with 15 in each group. They were pre- and posttested on their medication compliance level in terms of pills taken (hypothesis 1) and pills taken at prescribed intervals (hypothesis 2) and blood pressure (hypothesis 3).

Subjects who received the treatment protocol were visited in their homes biweekly during 4 weeks for a total of three visits. Control subjects were visited in their homes at the beginning and end of the 4 week period for a total of two visits. They received a treatment during the second visit.

All data obtained were treated by analysis of covariance and failed to be rejected. In this sample, there were no significant differences in medication compliance in terms of the number of pills taken

(hypothesis 1) and number of pills taken at prescribed times (hypothesis 2) and blood pressure (hypothesis 3) between the experimental and control group of noncompliant hypertensive patients. The treatment group's medication compliance was not significantly better statistically than the control group's medication compliance, nor was the treatment group's blood pressure significantly lower statistically than the control group's blood pressure.

Posttest medication compliance level of the experimental group for pills taken was 74% (pretest was 30%), while the control group's posttest medication compliance was 63% (pretest was 42%). The experimental group's score increased 160% and the control participants' increase was 41%.

The treatment group's posttest score for pills taken at prescribed intervals was 74% (pretest was 28%), and the group without treatment scored 62% (pretest was 38%) for pills taken at prescribed intervals. The experimental group's increase was 179% and the control group's increase was 55%.

The experimental group's posttest blood pressure was 84, a decrease of 16 mm Hg or 19% decrease between pre- and posttest. The control group's posttest blood pressure

was 92, a decrease of 9 mm Hg or 10% decrease between pre- and posttest.

## Discussion of Findings

Due to the small sample size, lack of random selection, and short duration of the study, findings of this study are only tentative, apply only to the sample, and are not generalizable to the accessible population. These limitations as well as others are considered in the discussion of findings relative to theoretical and empirical explanations.

Statistical interpretations did support the three null hypotheses examined. Findings suggested that the patients who received the treatment protocol, did not increase their medication compliance significantly greater than those who did not receive the treatment, nor was the experimental group's blood pressure significantly lower than the control group. In other words, the nursing interventions studied did not make a statistically significant difference in the medication compliance and diastolic blood pressure between the two groups.

On the other hand, the findings demonstrated clinical significance. The treatment group's posttest medication compliance level regarding pills taken was 74% (an increase of 160%) and pills taken at prescribed intervals

was 74% (an increase of 179%); the control group's posttest medication compliance level of pills taken was 63% (an increase of only 41%) and pills taken at prescribed intervals was 62% (an increase of only 55%). The experimental subjects' increase was better than the controls' medication compliance.

Practical significance was also demonstrated in blood pressure reduction. The treatment group's posttest diastolic blood pressure was 84 mm Hg (a decrease of 16 mm Hg) as compared to the control group's posttest diastolic blood pressure of 92 mm Hg (a decrease of 9 mm Hg). Not only had the treatment group's diastolic blood pressure decreased more than the control's, it was below 90 mm Hg, unlike the control.

Clinical significance of these findings is supported by the one study cited, which examined the specified nursing interventions. Haynes et al. (1976) found a clinically significant increase in medication compliance and decrease in diastolic blood pressure of noncompliant hypertensive patients. However, results from inferential statistical treatments are not reported. They acknowledged the potential impact of increased attention of their results.

## Conclusions and Implications

The proposition in Bandura's social learning theory, the theoretical framework of the study, tested in the study was: If the immediate or anticipated consequences of a new behavior are perceived to be more desirable, more valuable, or less punitive than a previous behavior, then the newly acquired behavior will be governed by more than one source of behavioral regulation. Qualitative data obtained through documentations of the Summary of Visit Instrument demonstrate support of this proposition.

Although there were no statistical differences in medication compliance between the two groups, clinically significant compliance increases and diastolic blood pressure decreases in both groups suggested their desire to attain blood pressure reduction, perception of the value to improve their medication compliance behavior and need to change their previous level of noncompliance. Although the length of the study did not facilitate collection of adequate data to determine whether the increased compliance was retained, scrutiny of the data indicated that more than one source of behavioral regulation contributed to their decision to change their noncompliance.

Similar to other studies (Abrams & Wilson, 1979; Harmon, Nelson, & Hayes, 1980; Kazdin, 1974), evidence suggested the reactive effects of self-monitoring. Several experimental patients stated that simply knowing what their blood pressures were and that their blood pressures were elevated was the major influences of their increased compliance. Likewise, knowing that their blood pressures had decreased helped them to maintain an increased compliance. Similarly, experimental patients whose blood pressures were not elevated, stated that knowledge of their blood pressures to be within normal limits, only reinforced their disbelief in the doctor's diagnosis of hypertension and continued noncompliance. These validations suggest the impact of primarily one source of regulation; that is, self-monitoring. Such evidence gives support to the theory of self-regulation by Kanfer (1970). However, without the investigator's instructions for learning how to take one's blood pressure or some other educational source and blood pressure equipment, self-monitoring would not have been possible. These patients' behaviors validate the dominance of self-regulatory processes with the support of external influences. Thus, stimulus control, outcome control, and symbolic control all appeared to be operating.

Evidence also demonstrated that the nursing interventions of tailoring and offering blood pressure equipment as a reward were not always needed by experimental subjects. When patients admitted that they often forgot to take their medicines, a plan for tailoring their medication administration to a habit or ritual was implemented. Only five patients used the tailoring strategy and all felt that this intervention helped to improve their compliance level. Likewise, blood pressure equipment, although offered to all experimental subjects as a reward for a 90% to 100% compliance, several admitted that this was not as motivating although they valued or wanted the equipment; others repudiated its importance. These observations suggest that more than one control system was operating, but the extent to which they predominate depends upon one's individual needs, values, beliefs, desires, circumstances, and other variables which influence the decision-making process. Selection of the most effective strategy(ies) requires input from both the patient and the nurse. It also implies the influence of both internal and external factors involved in behavioral change.

The fact that control subjects' medication compliance level increased without exposure to the treatment protocol

also suggested the impact of personal and environmental factors in behavioral changes. In spite of the fact that increased supervision from the investigator and the Hawthorne effect of mere participation in the study are limitations of the study, their possible influence also gives evidence of more than one source of behavioral regulation contributing to a change in behavior.

The complexity of compliance is further validated by these theoretical interpretations of Bandura's social learning theory. Analysis of these data supports the proposition tested in the study.

The conclusions are impacted by the limitations of the study. A small nonprobability sample of only 30 participants, the short duration of only 4 weeks, and the lack of control of psychosocial and environmental factors within the patients' homes could have contributed to the results. A difference of only one more visit to the experimental group was another limitation. The control group received almost as much attention from the investigator as the experimental. Increased supervision, short term benefits derived from interest and support of the family, and possible Hawthorne effect may have contributed to both groups' increase in compliance with subsequent decrease in diastolic blood pressure.

Therefore, inferences of findings are not generalized beyond this sample.

The results obtained indicated support of Bandura's social learning theory. It appeared that both internal and external factors were involved in the alteration of behavior. It was also apparent that the extent to which a control system is involved was dependent upon personal and environmental influences. Evidence from this sample indicated support for compliant as well as noncompliant behavior.

Although statistical significance of findings was not found, clinical interpretations may have implications for nursing practice and nursing education. The greater increase in medication compliance and greater decrease in diastolic blood pressure readings of the experimental group suggest the potential usefulness of such strategies in the clinical setting and classroom. Considering the limitations of this investigation, the validity of these interventions was not established. Therefore, it is questionable whether any noncomplier, nurse, and agency will benefit from implementing these interventions. Caution should be taken to do a thorough assessment of each situation to predict possible outcomes. The implications discussed are based on the assumptions that

such assessments have been done and suggest the probability of positive outcomes.

Teaching some hypertensive patients and/or their families how to take one's blood pressure might prevent and improve noncompliance. Self-monitoring enlists the patient's participation into managing his/her hypertension. More responsibility is assumed for the outcome of care when self-management is encouraged. Not only is it possible for the patient to evaluate more objectively one's behavior in terms of the effects of the prescribed treatment, frequent self-recordings might help the health provider to plan more effectively. The potential for promoting a mutually interdependent relationship between the patient and health provider is increased through self-monitoring. Another potential benefit is an increase in self-esteem from increased attention and being able to take one's own blood pressure. The choice of the individual or group teaching format would be determined by the needs of the patients, nurses, and availability of resources. In either approach, increased supervision will result.

Tailoring might also have positive implications for nursing practice. Since prescriptions usually direct patients to take their medication at certain intervals, helping to develop a system which will help the person to remember to take the medications is the nurse's responsibility. Assessment of a patient's daily habits or rituals provides a data base from which the best match between medication administration frequency and activity can be made. Forgetful and busy patients benefit from this strategy. If the need for tailoring is identified when the patient is first diagnosed, noncompliance due to forgetting might also be prevented.

The potential benefits received from positive reinforcement of acceptable behavior is well documented in the literature. Given praise, support, and acceptance for compliance improvements might be all that is necessary to retain good compliance for some patients. Although offering tangible items may be impractical for some agencies, other rewards which do not incur any expense may be quite as effective for other patients. Posting or publicly announcing a list of patients for the month, who have met some established criteria for adherence or cutting through the bureaucracy for easier return

appointments are examples of positive reinforcers that nurses could initiate.

There may be implications for nursing education. Teaching nursing students about the potential benefits of the nursing approaches might help them to be more astute in identifying noncompliant behavior and proficient in dealing with barriers often faced by health professionals when caring for such patients. Thorough assessments of the possible contributing factors of noncompliance require development of good communication skills. Students could increase their skills in observation and communication by giving care to noncompliers. Such skills have universal application from which any student might benefit. In addition, the challenges presented by noncompliant hypertensive patients could provide opportunities for dealing with the realities of the health care system. This experience could facilitate the socialization process to acquire skills that help to resolve issues of reality and nonassertiveness.

The conclusions and implications discussed are based on the significance of findings from a practical perspective. They suggest possible usefulness of strategies in nursing practice and education in selected situations.

## Recommendations for Future Study

Medication noncompliance is a universal problem. It appears to be a common behavioral response of patients who have life-long chronic illnesses and conditions. Thus, implications for future research will be potentially useful to anyone concerned with improving medication compliance. Findings suggest the need for replication with improvements in the methodological shortcomings of the study, the potential usefulness of identified nursing strategies in other populations of noncompliance, and the need for nontraditional studies of the phenomenon.

Based on the limitations of the study, the following suggestions are made to increase the potential for establishing the validity and reliability of findings as well as generalizability. Replications of the study in larger samples with longer durations are recommended. The lack of statistical difference between groups might have been due to the small sample size. Due to the nature and duration of the study, the accessibility of these patients is not very apparent. Use of nurses as referrals and utilization of more than one hospital clinic might increase the size of the accessible population and feasibility for random selection. More than 4 weeks is suggested to determine the extent to which compliance

levels are retained. Sufficient evidence of its effect on compliance retention could be obtained in a 6-month longitudinal study. Monthly follow-up visits after 8 weeks of biweekly visits might provide enough time to evaluate the short-term and long-term effects of the treatment. Also, it may reduce the impact of attention on the control group and increase the difference of increased supervision between the two groups.

Findings also suggest applicability of certain nursing strategies for certain types of patients. As an example, data indicate tailoring to be potentially useful to any patient whose noncompliance is due to forgetting. Likewise, self-monitoring blood sugar values might be beneficial to noncompliant diabetics. Studies of these strategies in patients with life-long conditions might help to establish their validity for these populations as well as facilitate identification of common patient characteristics that interact significantly with tailoring and self-monitoring.

Similarly, to determine whether any one of the strategies contributed more significantly than others, it is suggested to separate the strategies and randomly assign patients to one of the four groups: (a) self-monitoring and reinforcement; (b) tailoring and

reinforcement; (c) increased supervision and reinforcement; and (d) control. Reinforcement is included in each group that requires the investigator to make home visits, because findings suggest that the mere presence of the investigator is an external motivating factor.

Results also suggest the need for increasing the validity and reliability of compliance data. Use of self-report as the only measure of compliance level might be questionable in terms of its accuracy. However, adding a more objective measure like urine analysis of drug metabolites might strengthen pre- and posttest compliance data when comparing it to pre- and posttest blood pressure readings.

But in spite of this apparent improvement, other extraneous variables may influence the excretion of drug metabolites in urine. Such outcomes indicate the increasing complexity when measuring compliance as well as the deficiencies inherent in traditional research approaches when applying them to complex human responses. Relevant subjective data might be overlooked in quantitative methods and comprehensiveness may be lacking, since only parts of the phenomenon are studied. Perhaps, nontraditional approaches, like qualitative studies might

give additional data needed to understand how to improve compliance.

Therefore, case study analysis is recommended. With carefully constructed interview schedules used before, during, and after treatment, objective and subjective data could be collected. By identifying the attributes of noncompliance operating before treatment and examining the process of change in attributes during treatment and loss of and/or addition of other empirical referents after treatment, a better understanding of noncompliance, compliance, and the process of change may be acquired. Thus, the phenomenon could be observed holistically. Perhaps, a theory of compliance and noncompliance might evolve.

These are just a few suggestions for research implied by the findings of the study. Both quantitative and qualitative methods are recommended. Such evidence demonstrates the wealth of knowledge needed to determine the most effective methods for improving compliance.

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# APPENDICES

# APPENDIX A

## Research Review Approval

TEXAS WOMAN'S UNIVERSITY
Box 23717, TWU Station
Denton, Texas 76204

1810 Inwood Road
Dallas Inwood Campus

HUMAN SUBJECTS REVIEW COMMITTEE

Name of Investigator: Debra L. Austin Center: Dallas

Address: 112 Rockingham Rd. Date: 12/13/84

Columbia, SC 29223

Dear Ms. Austin:

Your study entitled Selected Nursing Interventions for Noncompliant Hypertensive Patients

has been reviewed by a committee of the Human Subjects 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 typically require that signatures indicating informed consent be obtained from all human subjects in your studies. These are to be filed with the Human Subjects Review Committee. Any exception to this requirement is noted below. Furthermore, according to DHEW regulations, another review by the Committee is required if your project changes.

Any special provisions pertaining to your study are noted below:

____ 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.

____ Add to informed consent form: I UNDERSTAND THAT THE RETURN OF MY QUESTIONNAIRE CONSTITUTES MY INFORMED CONSENT TO ACT AS A SUBJECT IN THIS RESEARCH.

____ The filing of signatures of subjects with the Human Subjects Review Committee is not required.

__X__ Other: 1. On consent form paragraph five, change focus of benefits from others to subjects.
2. Delete first sentence of the last paragraph of the oral explanation.

____ No special provisions apply.

Sincerely,

Lois Hough

Chairman, Human Subjects
Review Committee

at Dallas

3. Be certain subjects understand the language of the oral explanation.

PK/smu/3/7/80

# APPENDIX B

## Agency Approval

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE Richland Memorial Hospital

GRANTS TO Debra L. Austin

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

Selected Nursing Interventions for Noncompliant Hypertensive Patients

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 See attached letter.

Date: Oct 30, 1984

Signature of Agency Personnel

Signature of student

Signature of Faculty Advisor

* Fill out & sign three copies to be distributed as follows: Original - Student: First Copy - Agency; Second copy - TWU College of Nursing.

# APPENDIX C

## Presentation to Subjects

## Oral Presentation to Potential Subjects

My name is Debra Austin and I am a doctoral nursing student at Texas Woman's University, Denton, Texas. I am conducting a study to help hypertensive patients with self-management of their condition. The study could help nurses to gain an understanding of the methods we can use to improve our treatment and care of hypertensive patients.

The study will involve your learning to take and record your blood pressure yourself and monitor your medication-taking behavior. You will be visited in your home every 2 weeks for two or three visits. At each session, your blood pressure will be taken and any problems that you have encountered will be discussed. The first session will probably last a minimum of 1 hour; subsequent sessions will last about 30 minutes.

Your name will be kept confidential; only code numbers will be used for identification purposes. Your refusal to participate or terminate at anytime during the study will not affect your treatment as a patient.

# APPENDIX D

## Consent Form

## Consents to Act as a Subject for Research and Investigation

I authorize Debra L. Austin, R.N. to help me with monitoring my hypertension and medication routine in order to reduce my blood pressure within normal limits. The procedure has been explained to me by Debra L. Austin, who has answered all my questions.

I understand that the procedure described involves minimal risks or discomforts.

I understand that my name and information in my medical records will be kept confidential and will not be released publicly. Only code numbers will be used for identification purposes in reporting test results. Scheduled appointments will be honored.

Should I agree to participate, my consent is voluntary and I may terminate my participation at any time. If I refuse to participate or terminate prematurely, this will not jeopardize my treatment as a patient.

I understand that by participating in this study I may be helping to improve the treatment and care of patients with high blood pressure. The results of this study may contribute to better reduction and control of

hypertension.

I also understand that no medical service or compensation is provided to subjects by Texas Woman's University as a result of injury from participation in this study. In the event you experience physical injury resulting either solely or in part from your participation in this project, Richland Memorial Hospital will make available the appropriate medical care and facilities, but the financial costs of this care will continue to be your responsibility.

_____ _____

Subject's Signature Date

_____ _____

Witness Date

# APPENDIX E

## Demographic Data Form

Demographic Data Form

(to be completed by investigator)

Date:_____

Identification Code:_____

Address:_____

_____

Telephone:_____

1. Sex: (check one)

   Female _____

   Male_____

2. Age:_____

3. Marital Status: (check one)

   Married_____

   Separated_____

   Divorced_____

   Widowed_____

   Single_____

4. Education: (write in number of years completed at the highest level reached)

   Elementary_____

   High School_____

   College (undergraduate) _____

   Graduate school _____

5. How long have you had high blood pressure? (write in nearest number of years if 1 year or more and nearest number of months, if less than 1 year)

_____

6. Blood Pressure: Rt. arm_____ Lt. arm_____

7. Do you believe that high blood pressure is a dangerous or serious disease? (check one)

Yes_____

No_____

I don't know_____

8. Place a check by any of the following disorders, if you have been diagnosed by your doctor.

Diabetes_____

Heart Trouble_____

Stroke_____

Kidney Disorder_____

Gallbladder Disorder_____

Others (write in)

_____
_____
_____

# APPENDIX F

## Medication Form

## Medication Form

(to be completed by investigator)

1. What medication(s) do you take for high blood pressure?

| Name of Medication | Dosage | # per day | Prescribed Frequency |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

2. Total Number/Day_____

3. Total Number/7 days_____

4. Do you believe that the prescribed medications help to lower your high blood pressure? (check one)

   _____ yes

   _____ no

   _____ I don't know

5. In the past 7 days did you take the total number of blood pressure medications as prescribed by your doctor every day? (check one)

   _____ Always (100% or 7 days)

   _____ Most (80% or 5-6 days)

   _____ Sometimes (50% or 3-4 days)

   _____ Occasionally (20% or 1-2 days)

   _____ Never (0% or 0 days)

6. Based on the number of days that you omitted taking your medication in the past 7 days, how many pills did you not take at all? (i.e., omitted) _____

7. In the past 7 days did you take your blood pressure medications at the prescribed intervals by your physician (e.g., every 6 hours, every 12 hours, every 24 hours, or once/day) (check one)

_____ Always (100% or 7 days)

_____ Most (80% or 5-6 days)

_____ Sometimes (50% or 3-4 days)

_____ Occasionally (20% or 1-2 days)

_____ Never (0% or 0 days)

8. Based on the number of days that you took your medication at the time not prescribed (i.e., missed) in the past 7 days, how many pills did you take later or earlier than prescribed?_____

9. If your answer to question #5 or #7 is most, sometimes, occasionally, or never, why didn't you take the medication(s) as prescribed? (answer briefly)

_____

_____

_____

_____

# APPENDIX G

## Tailoring Form

Tailoring Form

(to be completed by investigator)

1. What are some of your daily habits or rituals or things you do everyday about the same time each day?

| | |
|---|---|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

2. What have you done in the past to help you to remember to take your medication(s) as prescribed by your physician? (state briefly)

_____

_____

_____

_____

_____

3. Proposed tailored plan for medication routine:

_____

_____

_____

_____

_____

# APPENDIX H

## Summary of Visit Instrument

Summary of Visit Instrument

Visit _____

Date_____

Blood Pressure:

Medication Behavior:

Self-Reinforcement:

External Reinforcement:

Other Observations:

Interventions Implemented:

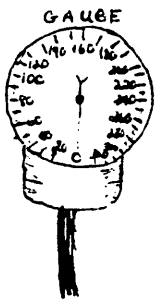
# APPENDIX I

## Instructions for Taking Blood Pressure

## Instructions for Taking Your Blood Pressure

1. Rest for at least 10 minutes before taking your blood pressure at about the same time every day.
2. Place the cuff evenly and snugly around the upper arm about an inch above the bend of the arm.
3. Feel for the pulse on the inner side of the arm at the fold off center toward your body.
4. Put the earpieces of the stethoscope in place and place its round flat part where pulse was felt and hold in place.
5. Turn the screw on the bulb of the cuff to the right (clockwise) to tighten, <u>but not too tightly</u>.
6. Pump air in cuff by squeezing and releasing bulb alternately until the hand on the gauge is 30 points (millimeters) above the last reading.


7. Listen for a tapping sound (similar to the pulse felt); if none heard, enough air has been pumped in; if any heard, continue to inflate until none is heard.
8. Slightly turn the screw to the left (counter-clockwise) to let air <u>slowly</u> out of cuff; LISTEN FOR FIRST TAPPING SOUND.

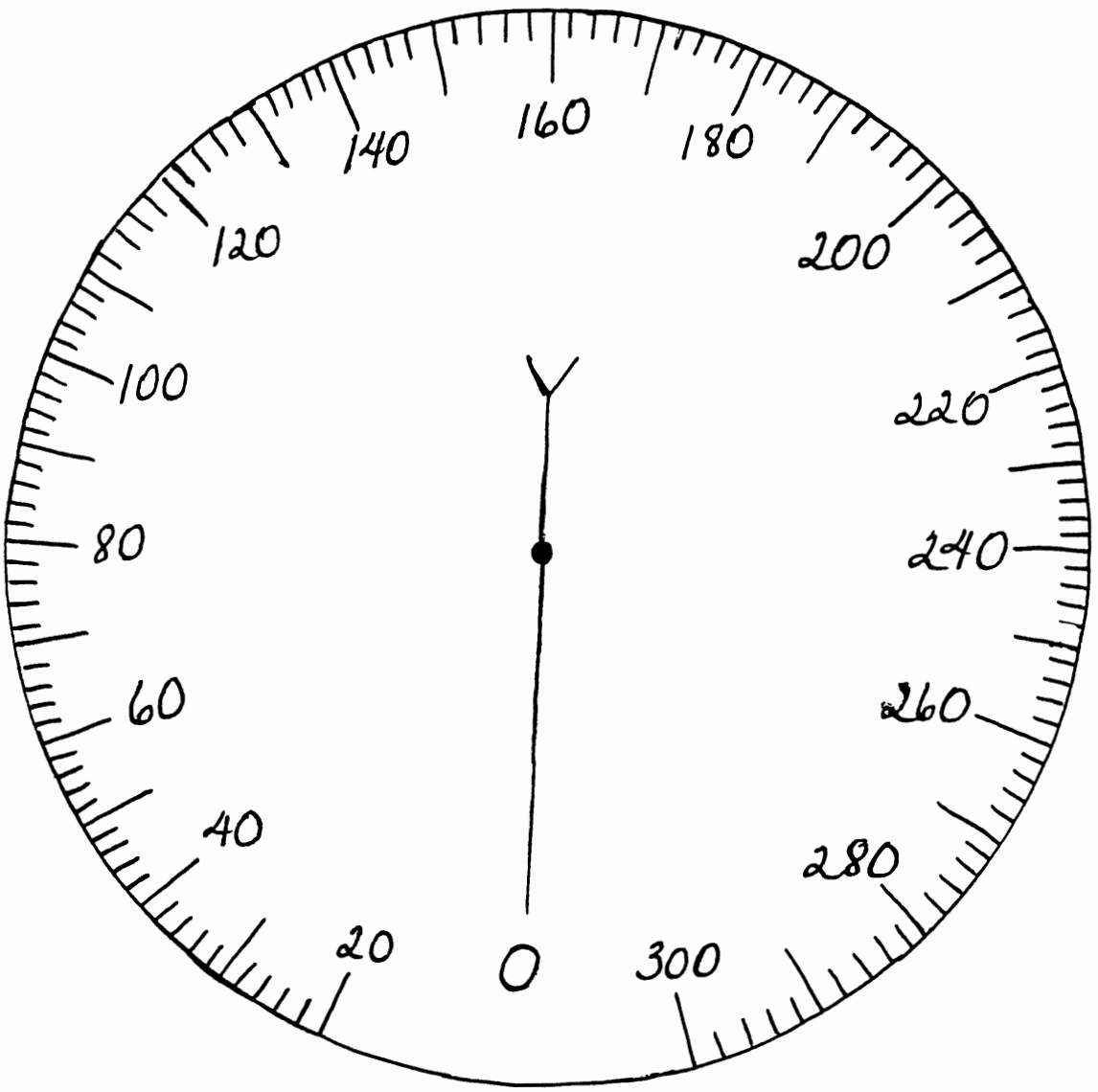



9. <u>Note the point at which the hand on the gauge is when first tapping sound is heard</u>. EACH LINE EQUALS 2 POINTS (MILLIMETERS)--similar to a thermometer or tire pump gauge. THIS IS THE NUMBER ON THE TOP (SYSTOLIC B.P., e.g., 142/?).
10. Continue to let air out. Sounds will get louder, then softer.
11. <u>NOTE the point at which the sound disappears</u>. THIS IS THE NUMBER ON THE BOTTOM (DIASTOLIC B.P., e.g., ?/80).
12. Remember both numbers and let all air out of the cuff.
13. Record "'" for top number and "o" for bottom number on the graph.
14. If you didn't hear it, wait at least 1 minute before repeating.

# APPENDIX J

## Blood Pressure Gauge

Blood Pressure Gauge



# APPENDIX K

## Data Collection Instrument

Blood Pressure and Pill Data Collection Instrument

| Day | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | | | | | | | | | | | | | | |
| Time | | | | | | | | | | | | | | |
| B.P. | | | | | | | | | | | | | | |
| # Pills Taken | | | | | | | | | | | | | | |
| # Pills Omitted | | | | | | | | | | | | | | |
| # Pills Missed | | | | | | | | | | | | | | |
| 220 | | | | | | | | | | | | | | |
| 210 | | | | | | | | | | | | | | |
| 200 | | | | | | | | | | | | | | |
| 190 | | | | | | | | | | | | | | |
| 180 | | | | | | | | | | | | | | |
| 170 | | | | | | | | | | | | | | |
| 160 | | | | | | | | | | | | | | |
| 150 | | | | | | | | | | | | | | |
| 140 | | | | | | | | | | | | | | |
| 130 | | | | | | | | | | | | | | |
| 120 | | | | | | | | | | | | | | |
| 110 | | | | | | | | | | | | | | |
| 100 | | | | | | | | | | | | | | |
| 90 | | | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | | | |
| 70 | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 0 | | | | | | | | | | | | | | |