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BEESON, SUSAN A. The Effect of Teaching by the Nurse on Patient Knowledge of Medications and Compliant Behavior. (1977) Directed by: Dr. Eloise R. Lewis. Pp. 64.

It was the purpose of this study to determine if teaching intervention by the nurse on a one-to-one basis in a hypertensive clinic situation resulted in the patient being more knowledgeable about medications and making fewer medication errors. It was hypothesized that when patients attending a hypertensive clinic were taught individually by a nurse, they would be more knowledgeable about their medications. It was also hypothesized that when patients attending a hypertensive clinic were taught individually by a nurse they would commit fewer medication errors than patients who received no nurse teaching.

The subjects were 17 patients who were receiving medication for hypertension. The entire sample group was black with a total of 10 females and 7 males. All patients were pretested for assessment of medication knowledge. Nine members of the experimental group were individually instructed by the nurse researcher about their hypertensive medication. A posttest was given to the entire sample group when they returned to the clinic in two weeks, in order to determine degree of improvement over pretest knowledge according to group. The variables used to determine compliance with medication therapy were patient report, pill count, and blood pressure measurement.

A one-way analysis of variance was used to determine if there was significant difference between the groups according to improvement on the posttest for knowledge of medications, and number of medication errors according to pill count and patient report. The significance level was set at .05 for rejection of the null hypothesis.

Hypothesis one, that individual teaching by a nurse would increase patient knowledge, was accepted. Although statistically hypothesis two, that patients receiving nurse teaching would commit fewer medication errors, was not accepted, there was an observable difference between the groups. A lower percentage of the experimental group made medication errors, and the mean number of medication errors was also lower for this group.

THE EFFECT OF TEACHING BY THE NURSE ON  
PATIENT KNOWLEDGE OF MEDICATIONS  
AND COMPLIANT BEHAVIOR

by

Susan A. Beeson

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APPROVAL PAGE

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## CHAPTER I

## INTRODUCTION

Statement of the Problem

The development of highly effective drug therapies for certain illnesses has led to an increase in the number of people being responsible for self-administration of medications. Although there is an expectation among health workers that patients will follow their physicians' recommendations, reports indicate that the compliant behavior of most people falls short of what is known to be optimal health.

This researcher's interest in the subject of noncompliance with medication therapy resulted from personal observations of patients, friends, and family members who used medications incorrectly. These observations led the researcher to believe that a large percentage of individuals did not take medications correctly. Many people misunderstood how to take medications, received relatively no instructions, or voluntarily chose not to follow these instructions.

A review of the literature supported the researcher's belief that individuals on self-administration of medications made a high percentage of errors. One study (Stewart and

Cluff, 1972) stated that 4 to 35% of the study patients were misusing medications to such an extent as to pose serious threat to their health. Since the highest level of health for many individuals depends upon adherence to daily administration of certain prescribed medications, it is necessary that these medications be taken properly.

Although many factors affected compliant behavior, greatest emphasis was placed on the need for patient education about prescribed medications. Hulka, Cassel, Kupper, and Burdette, in a 1976 study, stated:

Rarely have researchers and practitioners seriously studied the extent to which apparent non-compliance is merely the lack of congruity between what the patient thinks he is supposed to do and what the physician thinks the patient is doing. (p. 851)

This statement has significant implications for all members of the health team who have contact with the patient. Komaroff (1976), in emphasizing the need for educating patients about their illness, stated that members of the health team other than the physician may best fill this role.

There appears to be great need for additional research and action by the nurse in an effort to improve compliance in medication self-care of the patient. A preliminary search of the literature convinced the researcher that additional study was needed pertaining to the teaching role of

the nurse in helping the patient comply appropriately with medication therapy.

#### Purpose

The purpose of this study was to determine if teaching intervention by the nurse on a one-to-one basis in a hypertensive clinic situation resulted in the patient being more knowledgeable about medications and making fewer errors when he was administering his own medications.

#### Hypotheses

The following hypotheses guided the investigation.

1. When patients attending hypertensive clinic are taught individually by a nurse, they will be more knowledgeable about their medications than patients who receive no nurse teaching.

2. When patients attending hypertensive clinic are taught individually by a nurse, they will commit fewer medication errors than patients who receive no nurse teaching.

#### Definition of Terms

The following terms were operationally defined for this study.

1. MEDICATION ERROR - a medicine ordered by the doctor but not taken by the patient, or a medicine ordered by the doctor but taken in incorrect doses.

2. TEACHING - individualized instruction by the researcher on a one-to-one basis with clearly established objectives and lesson plans.

3. COMPLIANCE - act or practice of self-administration of medications as directed by the physician.

4. KNOWLEDGE - percentage of correct items on medication questionnaire.

#### Assumptions

An assumption considered basic to the study was that inadequate communication between medical personnel and the patient may lead to noncompliance. Also, the researcher was assuming that teaching by a nurse would improve communication since the nurse was the logical person to do the teaching.

#### Limitations

The two following limitations were considered to be important in analyzing and interpreting the findings of this study. Patient report of medication administration, as indicated by a drug calendar in this study, may not always reflect what actually was taken. The researcher also

recognized that other factors may have an effect on compliance such as the patient living alone, the number of medications he was taking in addition to the hypertensive medication, and the severity of his illness.

#### Justification

Many studies have shown that individuals who were responsible for taking their medications often made a large number of errors. Numerous studies revealed the rate of noncompliance with medical regimens to be significantly high. Stewart and Cluff (1972) reported medication errors to be as high as 59% with 4 to 35% of the patients misusing their medications to the extent that their health could have been threatened.

The need for educating patients about their illness in order to improve compliance with medication therapy has been emphasized in several studies. Komaroff (1976) stated that patients should be taught about their illness and that he believed physicians might not be the best educators. He expressed the opinion that other members of the health team should fill this role.

Since nurses comprise the largest number of health care personnel in the United States, patient teaching about prescribed medications should be an important function of

nurses in many health care settings. Marston (1970) reported in a review of literature that:

Although the types of interactions which occur between patients and their physicians have been found to be predictive of compliance behavior, the literature does not contain studies of the role of the nurse in promoting compliance. Nurses spend more time with patients than do physicians, and thus potentially have more opportunity to influence their health behavior. More systematic investigations of effective nurse-patient interactions are needed. (p. 321)

In Nursing Clinics of North America (1971) Barbara Redmon reported that it is generally accepted that the nurse is a key person in teaching patients about their illnesses, adjustments which these illnesses require, treatments to be performed at home and/or the clinic, and symptoms of untoward reaction. Redmon explained that patient teaching is a vital part of patient care and can be used in all four modes of nursing intervention: to prevent, to promote, to maintain, and to modify.

Pohl (1965) identified the need for people to have help in assuming responsibility for their health care, and believed that the nurse had a unique contribution to make to the promotion of health because of her close contact with those who need health care. Palm (1971) stated that teaching of patients also facilitates the individual's adaptation to his disease or disability, but for such teaching to occur,

those who come into frequent direct contact with patients must consider this an important aspect of their total care.

Leary, Vessella, and Yeaw (1971) found that although nursing literature advocated that nurses teach patients health care, only 8.3% in their subject group indicated they had learned about their medications from a nurse. Patients were vague, confused, or ignorant about the purpose for which they were taking their medications. The authors stressed the importance for nurses as health teachers to assume responsibility for initiating an evaluation of patient knowledge about medications and for coordinating efforts to ensure greater quality and effectiveness of teaching patients.

This researcher believes that there is an emerging need for the nurse to assume a central role in teaching patients about medication therapy. The nurse's unique relationship with the patient and her presence in nearly all health care settings can have a profound effect on how well the patient understands and complies with needed medical care at home.

CHAPTER II  
REVIEW OF THE LITERATURE

This chapter presents a discussion of the literature and problems related to compliance with medication therapies. Also the teaching function of the nurse and the use of the concepts of teaching and learning in patient care are reviewed.

Problems Related to Compliance

With Medication Therapy

Review of the literature revealed that noncompliance with medical regimens posed significant health problems for patients. Medical practitioners indicated that compliance with physicians' instruction is essential for effective treatment and for improved states of health. An editorial in the September 1976, American Journal of Public Health stated:

For centuries practitioners have attributed successful outcome in part to the potency of the medication they prescribed. Unsuccessful outcomes have been attributed to weak medications, insurmountably ill patients, or divine intervention. Research conducted largely in the past twenty years has given us a more sophisticated understanding of what goes on when we prescribe a medication. Investigations of the placebo response phenomenon have demonstrated that a successful outcome

may derive from the process of prescribing a medication regardless of the pharmacologic action of the medication . . . An unsuccessful outcome may be due to the drug not being taken as prescribed. (Komaroff, 1976, p. 855)

Numerous studies revealed the rate of noncompliance with medical regimens to be significantly high. An extensive review of literature by Marston (1970) reported findings of 32 studies conducted from 1954 to 1970 concerning compliance with drug recommendations. These studies included patients on penicillin, iron preparations, sulfadiazine, tranquilizers, and other medications. Noncompliance was found to be as low as 4% and as high as 100%. A review of the literature by Davis estimated that approximately 30 to 35% of the patients failed to follow physicians' recommendations. Blackwell (1973) also reported complete failure to take medication in approximately 25 to 50% of outpatients.

A review of medication errors and compliance in ambulant patients by Stewart and Cluff (1972) incorporated many of the same studies reviewed by Marston (1970) and included additional studies. They found errors in self-administration of prescribed medications to range from 25 to 29%. Of the patients studied, 4 to 35% were making health threatening errors.

### Methodologies Used to Measure Compliance

Many different methodologies were used to measure patient compliance in the studies reviewed. Marston (1970) found the degree of objectivity with which compliance was measured varied and operational definitions differed among investigators. The most frequently used techniques for measuring compliance were tests for drug excretion or tracer substances deliberately attached to the medication. Marston (1970) found pill count and patient report to be less objective measures. In contrast, Komaroff (1976) found simple pill counts were used most often and were believed to be reasonably accurate. Several investigators developed composite indices of compliance based on more than one measurement technique and combined compliance ratings for different types of medical recommendations. Patient report was found to be the easiest method and was used in conjunction with results of excretion tests and pill counts (Marston, 1970).

### Factors Affecting Compliance

Many factors were identified as having influence on the patient's compliance with medication therapy. These factors were reflective of the patient, the practitioner, (whether a physician, nurse practitioner, or physician assistant) and

the patient-practitioner relationship (Komaroff, 1976). Nurse factors in the literature were described under the section entitled "Justification" of the study and elaborated in terms of teaching characteristics in the section entitled "Teaching and Learning Concepts."

#### Patient Factors

Marston found the use of personality tests and demographic variables such as age, sex, socioeconomic factors, education, religion, marital status, and race rarely predictive of compliance. Redmon (1971) believed that persons of lower socioeconomic status would have added barriers to follow-through. These persons were found to need health goals and values interpreted to them so they could accept health information.

At least one study showed that patients at extremes of age were more likely to be noncompliant and another study revealed that patients living alone were not as compliant with medication therapy (Komaroff, 1976). A report in the Journal of Public Health (Hulka, Cassel, Kupper, and Burdette, 1976) indicated no consistent pattern of drug errors in relation to patient characteristics or measures of disease severity.

Rosenstock (1975) pointed out that adequate compliance depended on the patient understanding his susceptibility to an illness and the potential severity of the illness. With indolent chronic illness, the course of which appeared to be only slightly altered by treatment, noncompliance was more common. Hulka (1976) and Marston (1970) found an absence of association between severity of illness and compliant behavior.

Several studies (Hulka et al., 1976; Marston, 1970; Stewart et al., 1972) reported the number of drugs involved was clearly associated with noncompliance. Increased frequency of scheduling medications was associated with increased errors.

Marston (1970) reported that knowledge alone concerning illness and its treatment had not provided motivation for compliance. However, more recent studies (Blackwell, 1973; Hulka et al., 1976; Rosenstock, 1975; Stewart et al., 1972) associated knowledge and understanding of the medication therapy with compliant behavior. The only factor found by Stewart et al. (1972) to have significant effect on compliance in addition to the number of medications taken by the patient was the patient's knowledge of the purpose of the medications. Stewart emphasized the need for patients

to receive instructions concerning how to take the medication prior to discharge. Hulka et al. (1976) found that knowledge of drug function decreased error rates. When patients were informed as to what was expected of them, their behavior conformed to the expectation more than 85% of the time. A study by Mazzullo (1972) indicated that if instructions were to be followed, they must be understood by the patient. Leary et al. (1971) reported that medical and nursing literature pointed out repeatedly that knowledge of action, dosage, timing, and side effects or reactions was essential for a therapeutic program to be effective and safe.

It has become increasingly obvious that the most important contribution to compliance is the understanding a patient has of the illness, the need for treatment, and likely consequences of both (Blackwell, 1973). Rosenstock observed patients who did not fill prescriptions because it had not been made clear to them why they should take the medication. He stated that physicians should take time to explain what medication they are prescribing, why and how it will be beneficial, and for how long to use the medication. He emphasized the need for patients to understand specifically what was being prescribed, the rationale of the regimen, and how it was to be followed. It is obvious that

members of the health team must assume the responsibility of teaching patients about their medications if this goal of understanding by the patient is to be reached.

### Nurse-Patient Relationship Factors

#### Affecting Compliance

A search of the literature revealed several studies investigating the effect of nursing intervention on patient compliance with medication therapy.

Hecht in 1974 tested the hypothesis that when adult patients were given planned, individual instruction by nurses, they would commit fewer medication errors at home than patients not receiving such instruction. Results of the study showed that with increased amounts of teaching there was a large improvement in the accuracy with which patients took their medications. Based on pill count, serious error was reduced from 53% in the control group to 17% in patients in the group receiving the most teaching. This finding supported previous reports that a large percentage of patients made medication errors at home.

Fournet (1974), a nurse, investigated the effect of individualized teaching by the nurse on three groups of patients being discharged from the hospital on diuretic therapy. One group received only routine instruction, the

second group received verbal instruction, and the third group received verbal instruction and a printed booklet. All patients were pretested before instruction and post-tested two to three weeks following discharge. The results showed no improvement in knowledge by those patients who received only routine hospital instruction. The group receiving verbal teaching showed a twofold increase in correct responses, and a greater-than-twofold increase in correct responses occurred in the group receiving verbal and printed instruction.

"Teaching Cardiac Patients to Manage Medications" was the title of a study conducted by DeBerry, Jefferies, and Light (1975) to determine if patients could retain sufficient information about medications for adequate self-care after leaving the hospital. In this study daily drug cards and calendars helped the patients take cardiac medications at home more safely. The recommendation was made that when teaching patients about medications particular emphasis should be placed on the purpose of the drug and when to call the doctor.

#### Teaching and Learning Concepts

In order to be an effective teacher, the nurse must have an understanding of the learning process. Barbara

Redmon (1971) stated that a person must have had experiences making him ready to learn what is desired, and emotional readiness must be present. The nurse must analyze what behaviors are prerequisite so she can determine whether the learner possesses them. It must be remembered that learning is most effective when the individual is ready to learn.

The nurse must also realize that what is said to the learner is not the only information given to him and may be the least important (Stanford and Roach, 1974). We tend to perceive what we are expecting and to distort reality to fit our expectations. Personal needs influence communication significantly. Threat has a negative effect on communication because it affects perception. Trust is an important variable in communication and all movement and sound serve a communication purpose.

The nurse, in approaching the teaching situation, should apply the following principles of learning (Pohl, 1973, p. 24).

1. "Perception is necessary for learning" although individual differences in perception and unrecognized errors in perception are problems in learning.

2. "Conditioning is a process of learning" and can be used to the advantage of the learning situation.

3. "The process of trial and error is a way of learning" and implies that the nurse should use approval and encouragement in an attempt to reinforce learning. Teachers must be aware of misconceptions and correct them through reeducation.

4. "An individual must be motivated in order to learn" and the motivation must persist throughout the learning process. At times the nurse will have to help the learner see the need by appealing to his desire to get well or stay well.

5. "Physical and mental readiness are necessary for learning."

6. "The more the learner participates, the more likely he is to learn well and to remember what he has learned."

7. "New learning must be based on previous knowledge and experience."

8. "If the emotional climate is extreme, little learning will take place."

9. "The nurse should also remember that repetition and satisfaction reinforce learning."

Redmon (1971) reminded the nurse to use learning theories to facilitate learning by realizing that the learner's abilities and the demands of the situation determine learning

goals. Individuals vary in their readiness for health learning because of their general educational backgrounds, intellectual abilities and attitudes toward acceptance of responsibility. Goals of health learning may vary a great deal even for individuals with the same disease. Special concerns brought about by illness or suspicion of illness will alter interest in learning.

Pohl (1973, pp. 39-49) stated that the principles of teaching were derived from the principles of learning.

1. "A good nurse-learner rapport is important in teaching." The first step toward bringing about a climate encouraging to the learner's cooperation is establishing a positive, constructive relationship with him.

2. "Teaching requires effective communication." We must not assume that other people use words in just the same way we do.

3. "Facial expressions, gestures, and general physical behavior of the learner may provide cues as to how well he is learning." The nurse should remember that she is also giving the learner nonverbal cues.

4. "Learning needs should be determined before beginning the teaching process." Objectives should serve as guides in planning and evaluating what has been taught.

5. "The environment is an important aspect of learning."

#### Summary

A review of the literature has established strong support for the assumption that medication errors made by patients at home were commonplace. Although many factors had an effect on compliant behavior, the literature review gave strongest emphasis to the need for patient education leading to understanding in order for error-free compliant behavior to occur. The need for the nurse to assume the role of teacher due to her unique relationship with the patient and her presence in most health care settings was strongly supported in the literature. In assuming the role of teacher, the nurse must apply the principles of teaching/learning if she is to be effective in helping the patient follow necessary therapy at home.

## CHAPTER III

## METHODOLOGY

Research Design

A comparative experimental approach was used in this study to investigate the relationship between teaching by the nurse and: (1) patient knowledge of medications and (2) patient compliance with medication therapy. The effect of teaching on medication knowledge was measured through the use of a pretest given to all patients for baseline knowledge and a posttest administered two weeks later for measurement of increase in knowledge. Patient report of medication intake; a pill count; and blood pressure measurements were the variables used to test the hypothesis that teaching would increase compliance with medication therapy.

Randomization was achieved through the alternate assignment of patients to either the experimental or control groups. Seventeen patients of the 26 patients who met the study criteria took the pretest and posttest and were thereby included in the sample group. The size of the sample group was limited by the six-week time available for conducting the study.

In examining the relationship between nurse teaching and patient knowledge; and nurse teaching and medication errors, the researcher assumed that teaching would increase patient knowledge and also would increase patient compliance with medication therapy.

#### Sample Population

The target population included all patients attending a county health department Hypertensive Clinic for whom medication was prescribed. Additional criteria for admission into the study were: (1) no medication for hypertension was received during the past month, (2) age was at least twenty and not more than seventy-five years, (3) education was from third grade to higher grades, (4) visual disability was absent. Twenty-six patients met the above criteria with the first patient becoming a member of the experimental group, and patients thereafter being alternately assigned to either the experimental or control group. Nine patients who were pretested did not return for the posttest within the allotted six weeks and were therefore excluded from the study. The study sample included the seventeen patients who returned for the posttest.

## General Procedure and Data Collection

### Pretesting

Patients meeting the study criteria were referred to the researcher for oral pretesting, after seeing the doctor for prescribed treatment and the nurse for schedule of reappointment in two weeks. The only identified teaching carried out by clinic personnel in relation to medications was an explanation by the doctor of the reason for the medication and the time of day it was to be taken.

The nurse researcher introduced herself to the patient as a registered nurse who would talk with the patient about medication just prescribed. A lab coat was worn by the nurse researcher in keeping with the attire of other clinic personnel.

At that time the oral pretest was administered to all 26 patients and demographic data was collected. The researcher also recorded the name of the prescribed drug, frequency of administration, number of pills prescribed, and date of patient's return appointment. The baseline blood pressure and first clinic appointment blood pressure readings were secured from the patient record.

### Control Group

After administering the oral pretest, subjects in the control group were provided with a drug calendar (See Appendix A) for recording medication intake. They were asked to bring prescribed medication and the drug calendar when they returned to the clinic in two weeks. The control group received no other instructions.

### Experimental Group

The experimental group followed the same procedure as the control group except that after being pretested, they were instructed by the researcher on an individual basis about the one medication that had just been prescribed for hypertension. Instructions also included a written summary of medication information along with the drug calendar (see Appendix A).

### Posttesting

Patients from both the control and experimental groups were seen by the researcher in the clinic two weeks after their initial visit. At that time a posttest (see Appendix A) identical to the pretest was given to both groups. Drug Calendars bearing the medication intake record were collected. A pill count and a blood pressure reading were obtained. Patient consent was obtained at posttest time by way of

patient signature on a consent form (see Appendix D). The researcher obtained consent after teaching intervention since patient knowledge of involvement in the research might have contaminated the data.

#### Teaching Protocol

The experimental group received planned, individualized instruction from the researcher about prescribed medication for hypertension after being pretested (see Appendix B). Only one medication was taught to each patient per session and patients received medication instruction at only one session. The teaching plan included an explanation of the need for medication and how it affected the body; explanation of side effects; recognition of the medication by the patient and a plan for taking it each day. The teaching plan was based on commonly accepted principles of teaching and learning with clearly established objectives. Patients were taught on a one-to-one basis and teaching sessions lasted 10 to 15 minutes.

The medications were explained in the following manner:

- (1) the medication was named and the patient repeated it;
- (2) the purpose of the medication and action on the body were described;
- (3) the dosage and frequency were discussed;
- (4) possible untoward effects were discussed, and indications

for when the patient should notify the doctor. All information was placed on the Drug Calendars (see Appendix A).

### Instrumentation

#### Pretest and Posttest Instrument

The oral pretest and posttest along with acceptable answers was designed by Pauline DeBerry, Lenner Jefferies, and Margaret Light in a study conducted in 1973 entitled "What Cardiac Patients Can and Should Learn about Their Medications," and was used with their written permission (see Appendix C). The oral pretest established a baseline knowledge of medications and the difference in the pretest and posttest scores reflected the increase in patient knowledge of medications. Questions on the pretest and posttest were identical. The test consisted of eight basic questions:

1. Do you know the name of the medication you will be taking?
2. What is the medicine for?
3. When do you take it and how many pills do you take?
4. What should happen to you after you take it?
5. What bad effect could high blood pressure have if you don't treat it?
6. How does this medicine make your blood pressure lower?

7. How might you feel after you start taking this medicine?

8. When would you need to call a doctor?

The test included a checklist and based on the patient's response to each question, a check was made by the researcher in the appropriate category (i.e. correct, partially correct, incorrect, unknown; see Appendix A for a list of acceptable answers). Correct answers were assigned a value of one; partially correct answers were assigned a value of two, and incorrect or unknown answers received a value of three in the scoring procedure. With a possible range of 8 to 24, high scores indicated low knowledge level and low scores indicated high knowledge level.

#### Patient Report Through Use of Drug Calendars

Patient report of medication intake was used as a measure of compliance with medication therapy in order to test the hypothesis that nurse teaching would increase compliance with medication therapy. Patient report was obtained through the use of a drug calendar (see Appendix A) on which the patient checked each time medication was taken. The Drug Calendar was returned to the researcher at the time of post-test. Drug error was determined by subtracting the number of pills the patient reported taking from the number he should have taken.

### Pill Count

A pill count was the second measurement used to test the hypothesis that nurse teaching would increase compliance with medication therapy. The researcher recorded the number of pills prescribed by the doctor at the time of pretesting. When the patient returned in two weeks, a pill count was conducted and the discrepancy between the number he should have taken and the number he actually had taken according to pill count was recorded.

### Blood Pressure Measurement

The third measurement used to test the hypothesis that nurse teaching would increase compliance with medication therapy was a blood pressure measurement. Proper medication intake should have led to a subsequent drop in blood pressure. In order to control for differences between the control and experimental groups, a baseline blood pressure, taken when the patient was found to be hypertensive, was recorded. At the time of the pretest a second blood pressure reading was recorded. A third blood pressure reading was recorded at posttest time. The control and experimental groups were compared for significant group differences according to baseline blood pressure. They were then compared for significant blood pressure change between pre- and posttest readings.

### Statistical Methods

Statistical methods were chosen based upon the information necessary for the hypothesis and the adequacy of the data. Scores on the pretest and posttest for knowledge were analyzed through the use of a one-way analysis of variance which is a parametric statistical analysis used for comparing independent groups with a one-way experimental variable. A mean score on the pretest was subtracted from the mean score on the posttest for both the control and experimental groups. The statistical test determined if there was a significant change between groups. Increase in knowledge of medications was determined by examining the direction of the mean difference. The probability level of .05 was chosen for rejecting the difference in observed occurrences as due only to chance in sampling error. If the probability was .05 or less, the research hypothesis of difference was accepted rather than the null hypothesis.

A one-way analysis of variance was also used to determine if there was a statistically significant difference between the control and experimental groups according to patient report on drug calendars or pill counts.

An analysis of covariance was used to determine if there was a statistically significant difference in blood

pressure change between the experimental and control groups. The analysis of covariance controlled for group differences through the use of the baseline blood pressure data. The mean difference between groups in change in systolic pressure between the pretest and posttest was analyzed for statistical significance. The diastolic blood pressure was also analyzed through the analysis of covariance. The probability level of .05 was chosen for rejecting the difference in observed occurrences as due only to chance in sampling error.

CHAPTER IV  
ANALYSIS OF DATA

Data gathered in this study were statistically analyzed by computer. Each hypothesis was reviewed in relation to the description of the findings and their statistical significance.

Description of Sample and Study Groups

During the study a total of 26 patients met the criteria for the study. Initially 13 were in the experimental group and 13 were in the control group. Of this number, nine patients in the experimental group and eight patients in the control group returned in two weeks and were posttested by the researcher. Thereby the total study sample was 17 patients. The entire sample group was black with a total of 10 females and 7 males. The age range was from 25 to 71 years. The level of education ranged from 3 to 12 years.

Both groups were very much alike according to demographic characteristics. There was no more than one score difference on all variables except age. The mean age in years for the experimental group was 2.6 years younger than the control group (see Table 1).

Table 1

Distribution of Demographic Characteristics Between  
the Study Groups of Hypertensive Clinic Patients

Demographic Characteristics	Experimental Group	Control Group	Total
Sex			
female	5	5	10
male	4	3	7
Race			
black	9	8	17
white	0	0	0
Age in Mean Years	41.9	44.5	43.1
Education in Mean Years	8.6	8.8	8.6
Previously Treated for Hypertension	3	2	5
Taking One Additional Medication	2	2	4

### Hypothesis One

Hypothesis One dealt with the effect of nurse teaching on patient knowledge of medications. It stated:

When patients attending hypertensive clinic are taught individually by a nurse, they will be more knowledgeable about their medications than patients who receive no nurse teaching.

In order to test this hypothesis a pretest and posttest for knowledge was administered to both the experimental and control groups. Possible range of scores was from a low score of 24, meaning all answers were incorrect or unknown, to a possible high score of eight, meaning all answers were correct. The experimental group scores ranged from 18 to 21 on the pretest and from 10 to 17 on the posttest. This group had a mean improvement score of 5.66 points. The control group ranged from a high score of 13 to a low score of 20 on the pretest. They scored from 15 to 18 on the posttest with a mean improvement score of 1.13 points (see Table 2).

A one-way analysis of variance was performed to determine the significance of the difference between the posttest and pretest scores of the control group and the experimental group. With a predetermined .05 level of significance,

the experimental group scored significantly higher on the posttest minus pretest than the control group. Therefore, the hypothesis was supported that stated that patients attending hypertensive clinic when taught individually by a nurse would be more knowledgeable about their medications than patients who received no nursing teaching.

Table 2  
Mean Difference in Scores on Posttest - Pretest  
According to Group

Study Group	Pretest $\bar{X}$ Score	Posttest $\bar{X}$ Score	Post-Pretest $\bar{X}$ Score
Control			
N = 8	17.38	16.25	1.13
Experimental			
N = 9	19.33	13.67	5.66

Note: F Score was 13.56 with  $p$  of 0.002

Table 3 shows an item-by-item analysis of test questions according to percentage of improvement by groups. This analysis revealed improvement in both groups between the pretest and posttest for knowledge. The experimental group

showed a larger percentage of increase on all except one question.

Table 3  
Item Analysis of Percentage of Patients  
Showing Improvement Between Pretest  
and Posttest According to Group

Test Item Number	Experimental Group	Control Group
1	22.2%	12.5%
2	12.5%	0%
3	44.4%	12.5%
4	44.4%	12.5%
5	11.1%	25.0%
6	66.6%	0%
7	88.8%	25.5%
8	22.2%	0%

Patients in both groups were most knowledgeable about question two, What was the medicine for? Only one person in either group missed question two on the pretest. This subject answered correctly on the posttest.

### Hypothesis Two

Hypothesis two dealt with the effect of nurse teaching on compliance with medication therapy. It stated:

When patients attending hypertensive clinic are taught individually by a nurse, they will commit fewer medication errors than patients who receive no nurse teaching.

The nurse researcher assumed that nurse teaching would increase patient compliance with medication therapy, thereby reducing the number of medication errors. The variables selected to measure compliant behavior were patient report by way of drug calendar, pill count, and blood pressure measurement.

#### Medication Errors Reported by Way of Drug Calendars

In computing the number of medication errors according to drug calendar report, the number of medications the patient reported taking was subtracted from the number he should have taken. Table 4 shows that in the control group 75% of the eight patients made from one to 14 errors. Only 33% of the nine patients in the experimental group made errors with three patients reporting from one to three errors.

Table 4  
 Percentage of Medication Errors and  
 Mean Number of Errors According to  
 Group As Reported by Drug Calendar

Study Group	# of Pts. Making Errors	% of Pts. Making Errors	Total # Errors	Mean # of Errors
Control				
N = 8	6	75%	26	3.25
Experimental				
N = 9	3	33%	5	.63

Note: F Score was 2.750 with  $p$  of 0.11

Although there was an observed difference between the experimental and control groups according to reported medication errors, a one-way analysis of variance revealed no statistically significant difference between the groups. With a predetermined .05 level of significance, the analysis yielded an F ratio of 2.750 and an F probability of 0.115.

Medication Errors According to Pill Count

Medication errors according to pill count were determined by computing the difference between the number that

were prescribed and number actually taken according to pill count. Six of the eight members of the control group made a total of 23 medication errors. Four out of eight of the experimental group made errors for a total number of six errors (see Table 5).

Although the control group did make a larger number of errors than the experimental group, a one-way analysis of variance showed no statistical significance in the difference between the groups. With a predetermined .05 level of significance, the analysis yielded an F ratio of 1.638 and F probability of 0.220.

Table 5  
Mean Number of Medication Errors Made By  
Groups According to Pill Count

Study Group	# of Pts. Making Errors	Total # of Errors	Mean # of Errors
Control			
N = 8	6	23	2.9
Experimental			
N = 8	4	6	.75

Note: F Score was 1.638 with p of 0.220

Statistical findings according to pill count did not support the hypothesis that nurse teaching would significantly reduce the number of medication errors made by patients.

#### Blood Pressure Measurement

The researcher assumed that proper intake of medication would lead to a subsequent drop in blood pressure. A baseline blood pressure was recorded in order to provide control for group differences before pretesting.

Systolic blood pressure. The average systolic baseline pressure differed only four points between the groups (see Table 6). The experimental group experienced an average drop in systolic blood pressure of 20 points, and the control group's systolic pressure was lowered an average of nine points between the pretest and posttest.

The analysis of covariance revealed no significant difference between the experimental and control groups in drop in systolic blood pressure with a predetermined significance level of .05.

Diastolic blood pressure. Table 7 shows that the baseline and pretest diastolic blood pressures were very much alike with no more than four points difference in either group. The experimental group experienced an average drop

Table 6  
 Mean Difference in Groups According to  
 Change in Systolic Blood Pressure

	Baseline	Pretest	Posttest	Mean Difference
Study	Mean	Mean	Mean	Pre-Post-test
Group	Pressure	Pressure	Pressure	Pressure
Control				
N = 8	160	154	145	9
Experi- mental				
N = 9	156	141	121	20

Note: F Score was 0.918 with  $p$  of 0.999

in diastolic blood pressure of 18 points between the pretest and posttests. The control group's diastolic pressure dropped an average of 14 points. The analysis of covariance did not reveal any significant difference between the groups in change in diastolic blood pressure between the pretest and posttest. With a predetermined .05 level of significance, the hypothesis that nurse teaching would lower medication errors, according to diastolic blood pressure readings, was rejected.

Table 7  
Mean Difference in Groups According to  
Change in Diastolic Blood Pressure

Study Group	Baseline Mean Pressure	Pretest Mean Pressure	Posttest Mean Pressure	Mean Difference Pre-Post-test Pressure
Control N = 8	102	105	91	14
Experimental N = 9	106	104	86	18

Note: F Score was 0.075 with p of 0.999

## CHAPTER V

## SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This study examined the effect of nurse teaching on patient knowledge of medications and patient compliance with medication therapy. The study sample was composed of 17 patients being treated for hypertension at a county health department. Eight members of the control group received no nurse teaching. Nine members of the experimental group were individually instructed by the nurse researcher.

Both the experimental and control groups were pre- and posttested for knowledge of medications. The variables used to determine compliance with medication therapy were patient report, pill count, and blood pressure measurement.

A one-way analysis of variance showed that the experimental group significantly increased in knowledge on the posttest as compared to the control group. Teaching by the nurse did result in the patient being more knowledgeable about his medications on his return clinic visit. Patients in both groups were most knowledgeable about the question pertaining to why they were receiving the medication. This was probably because they were attending a hypertensive

clinic and were aware of their need for medication for hypertension. This question would have more significance for other medications and in a different health care setting.

Since the majority of these patients were receiving hypertensive medication for the first time, increased patient interest in beginning a medical regimen may have had influence on patient retention of knowledge. Thirteen of the 17 patients believed high blood pressure was a serious problem and this belief could have increased their interest level and caused a greater retention of knowledge.

Although the experimental group showed a larger percentage of improvement in knowledge on the posttest, the control group also improved on all but three questions. One reason may be that researcher contact with the patient, her interest in him, the pretest questions, and the drug calendar served as motivating forces even without structured teaching taking place.

The hypothesis that nurse teaching would have a positive effect on compliant behavior was measured by patient report, pill count, and blood pressure measurement. Although not statistically significant, the findings indicated an improvement in patient medication performance with nurse

teaching. A smaller percentage of patients in the experimental group reported medication errors according to the drug calendars. Also the mean number of medication errors was lower according to the pill count for the group that received nurse teaching. Although both groups showed a drop in systolic and diastolic blood pressure, the experimental group showed a greater decrease in both measurements than the control group.

Patients in both groups were very receptive to the use of drug calendars and cooperated well in bringing the calendars and medications back to the clinic. The consistency between the number of errors according to pill count and patient report indicated that both measures were reliable.

Since blood pressure can be influenced by numerous factors in addition to medication, it should never be used alone as a measure of compliance and is at best only suggestive of compliant behavior.

#### Recommendations

This study on nurse teaching presents several implications for teaching intervention by the nurse in a variety of health care settings. Also, the results suggest further research pertaining to the teaching role of the nurse.

### Recommendations for Further Study

This experiment suggested several recommendations for further study. A replication of this study using a larger sample group could possibly produce more significant findings in relation to compliance with medication therapy.

The use of the pretest, and drug calendar for recording medication intake was considered by the researcher to have a positive effect on compliance. A study might be conducted using the drug calendar for the experimental group and no drug calendar for the control group to test the effect of this variable on compliant behavior. Reminding the patient to bring his medication when he returned to the clinic was possibly helpful in promoting compliance. A study of the effect of nursing intervention other than in a structured teaching situation might be helpful in determining the role of the nurse in promoting knowledge compliance.

A study of patients after several months of medication therapy would more clearly reflect patients' overall compliant behavior in relation to teaching. Motivation to take medication is probably stronger at the beginning of therapy.

### Teaching Recommendations

The nurse as a teacher is effective in increasing patient knowledge not only with medication therapy, but with

any medical or nursing regimen the patient must undertake at home. If patient knowledge of medications can be increased through teaching, knowledge in other areas of medical and nursing care can also be increased. Patient knowledge of therapeutic or hygiene measures could also be increased through nurse teaching.

Patients from lower socioeconomic conditions or patients with less than a high school education can also benefit from teaching intervention by the nurse and within a two-week period did retain a significant amount of knowledge. The nurse should realize that lack of formal education or socioeconomic conditions should not deter the nurse in proceeding with teaching intervention. Redmon (1971) stated that persons of lower socioeconomic status would have added barriers to follow-through. Since this study deals with a lower socioeconomic group Redmon's statement makes the implications of this study even more significant.

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Partially  
Correct Correct Incorrect Unknown

7. How might you feel  
after you start  
taking this medicine?

--	--	--	--

8. When would you need  
to call a doctor?

--	--	--	--

Group \_\_\_\_\_ Blood Pressure Reading \_\_\_\_\_ Return

Appointment \_\_\_\_\_

## POSTTEST

Name \_\_\_\_\_

Partially  
Correct    Correct    Incorrect    Unknown

1. Do you know the name of this medicine?  
(Show medicine patient is taking)
2. What is the medicine for?
3. When do you take it and how many pills do you take?
4. What should happen to you after you take it?
5. What bad effect could high blood pressure have if you don't treat it?
6. How does this medicine make your blood pressure lower?
7. How might you feel after you start taking this medicine?
8. When would you need to call a doctor?


Group \_\_\_\_\_ Blood Pressure Reading \_\_\_\_\_ Pill Count \_\_\_\_\_

### MEDICATION

Name: Dyazide

What it does: Lowers the blood pressure by getting rid of extra fluid in the body.

- Cautions:
1. Always take the number of pills you were told to take. Do not take more or less without being told to by the doctor.
  2. Keep your prescription filled.
  3. You can expect to pass your water more often for the first few days after taking this medicine.

- Call the clinic if:
1. You have diarrhea for more than 24 hours.
  2. You begin to have headaches more often.

PLEASE MARK THE CALENDAR EACH TIME  
YOU TAKE YOUR MEDICINE

SUN.      MON.      TUES.      WED.      THURS.      FRI.      SAT.


### MEDICATION

Name: SER-AP-ES

What it does: Lowers the blood pressure by relaxing the blood vessels and getting rid of extra fluid in the body.

- Cautions:
1. Always take the number of pills you were told to take. Do not take more or less without being told to by the doctor.
  2. Keep your prescription filled.
  3. This drug makes the nose stuffy but it is to be expected.
  4. You can expect to pass your water more often for the first few days after taking this medicine.

- Call the clinic if:
1. You have diarrhea for more than 24 hours.
  2. You feel blue or down in the dumps all the time.
  3. Stuffy nose is intolerable.

PLEASE MARK THE CALENDAR EACH TIME  
YOU TAKE YOUR MEDICINE.

SUN.      MON.      TUES.      WED.      THURS.      FRI.      SAT.


## DRUG CALENDAR

PLEASE KEEP THIS WITH YOUR MEDICINE. BRING YOUR MEDICINE  
AND THIS CALENDAR WITH YOU WHEN YOU RETURN IN TWO WEEKS.

PLEASE MARK CALENDAR EACH TIME  
YOU TAKE YOUR MEDICINE.

SUN.      MON.      TUES.      WED.      THURS.      FRI.      SAT.


ACCEPTABLE ANSWERS TO PRETEST  
AND POSTTEST QUESTIONS

1. Do you know the name of the medicine you will be (or are in the case of posttest) taking?

The patient must state correctly the trade name of the medicine he is taking.

2. Why are you taking this medicine?

"for my blood pressure"  
"to lower blood pressure"

3. When do you take it and how many pills do you take?

The patient must answer this question completely correct for each medication.

4. What should happen after you take it?

"blood pressure should be lower"  
"blood pressure should come down"

5. What bad effect could high blood pressure have if you do not treat it?

"can cause heart attack, heart trouble, stroke, or kidney trouble"

Patient should include effect on heart, vascular system, and kidneys for correct answer. Any one or combination of two answers will be considered partially correct.

6. How will this medicine make your blood pressure lower?

A. Ser-Ap-Es - "by relaxing the blood vessels and getting rid of extra fluid"

B. Dyazide - "by getting rid of extra fluid in the body"

7. How might you feel after you start taking this medicine?

- A. Ser-Ap-Es - "weak and drowsy, nose stuffy, emptying bladder more often than usual"
- B. Dyazide - "weak, emptying bladder more often than usual"

Correct answer should include all answers stated for each medication. A partially correct answer would include at least one correct answer.

8. When would you need to call a doctor?

- A. Ser-Ap-Es - "diarrhea for more than 24 hours, feel blue or down in the dumps all the time, stuffy nose is unbearable"
- B. Dyazide - "diarrhea for more than 24 hours, headaches more often"



## TEACHING PLAN-HYPERTENSIVE PATIENTS

## Objectives:

1. Increase patient understanding of why he needs medication and how it affects his body.
2. Develop patient understanding of what side effects may occur while he is taking medication and when he needs to contact the doctor.
3. Develop patient ability to recognize medication by its appearance, call its name and determine appropriate time of day to take medication.
4. Increase patient awareness of need to take medication correctly and keep clinic appointments.

The following teaching plan will be used for patients being taught in a clinic situation who are placed on medication for hypertension for the first time.

- I. Explain need for medication and how it affects the body.
  - A. Definition of antihypertensive medication.
    1. Ser-Ap-Es - a drug that lowers the blood pressure by causing you to excrete larger amounts of fluids through the kidneys and also relaxes the blood vessels.
    2. Dyazide - lowers blood pressure by causing you to excrete larger amounts of fluid through the kidneys than you usually do.
  - B. Why is medication necessary.

Pressure is high in the blood vessels causing the heart to work harder to pump the blood through the body. If pressure remains high, it may cause effect on the heart, blood vessels, kidneys, or brain.

C. How medication reduces the blood pressure.

1. Ser-Ap-Es - this medication lowers the blood pressure by relaxing the blood vessels and getting rid of extra fluid in the blood vessels.
2. Dyazide - this medication gets rid of extra fluid in the body and decreases pressure in the blood vessels due to decrease in fluid content.

II. Explanation of side effects.

- A. Ser-Ap-Es - You may feel weak and drowsy when you start taking the medication and your nose may be a little stuffy, but this will probably not last long and you should not stop taking your medicine. You will be emptying your bladder more often than usual.

You should call the doctor if you:

1. Have diarrhea for more than 24 hours.
2. Feel blue and down in the dumps all the time.
3. Begin to have headaches often.
4. Stuffy nose is intolerable.

- B. Dyazide - You may feel a little weak and bad when you start taking your medication but this will probably not last long and you should not stop taking your medicine. You will be emptying your bladder more often than usual.

You should call the doctor if you:

1. Get an upset stomach that lasts 24 hours or more.
2. Begin to have headaches often.

III. Recognition of medication and plan for taking it each day.

Have patient look at medication and hold it - discuss color, texture, etc. Provide patient with a chart that he can keep with his medication, checking daily on the chart as he takes the medication. Discuss with him the best time of day for him to take the medication, reminding him that dyazide should be taken after meals. Talk about how it works into his schedule and where he can store the medication so he won't forget to take it.

IV. Emphasize to patient the importance of taking medication correctly and in correct dosage being careful not to double up or omit tablets. Stress that taking medicine correctly and keeping clinic appointments will minimize possibility of having serious effects from high blood pressure.



Route 3, Box 74  
Summerfield, N. C.  
December 1, 1976

Ms.  
School of Nursing  
University of North Carolina at Chapel Hill  
Chapel Hill, North Carolina

Dear Ms.

As a student in the Master of Science Nursing Program at the University of North Carolina at Greensboro, I am interested in the effect that teaching has on medication errors made by patients being discharged from the hospital.

I received your very interesting study, "What Cardiac Patients Can and Should Learn about Their Medications" and found it to be much like my study in some respects. I would like permission to use your pretest and posttest along with your list of acceptable answers. I found your pretest and posttest to be very thorough and inclusive and also your list of acceptable answers.

Your assistance in this matter will be very much appreciated. I will be looking forward to your answer.

Yours very truly,

(Mrs.) Sue A. Beeson, R.N.

**APPENDIX D****Sample Patient Consent Form**

## CONSENT FORM

I recognize that Sue A. Beeson is involved in a study evaluating the effectiveness of patient teaching in the implementation of nursing care. I have been informed that measures of the effectiveness of that teaching have been made and I agree that these findings may be used in her study. I further understand that my identity will not be revealed.

Signed \_\_\_\_\_

Date \_\_\_\_\_

I would like to receive a summary of the study.

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, please fill in address: