AN EXPERIMENTAL STUDY TO EVALUATE THE EFFECT OF PLANNED TEACHING ON SELF-MEDICATION PRACTICES OF OLDER AMBULATORY CARDIAC PATIENTS

by

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ABSTRACT

This experimental study was designed to evaluate the effect of planned teaching on the self-medication practices of ambulatory cardiac patients. The sample was composed of forty male and female cardiac patients who were over the age of forty-five years, who lived at home and were of low socio-economic status. They all lived in a large urban centre and attended an outpatient clinic for medical attention. All were taking digoxin and thirty-six, 18 from each group, were also taking a diuretic. They were randomly assigned to two groups, experimental and control, when they visited the outpatient clinic. The twenty patients in the control group were given the usual routine factual information during their clinic visit. The twenty patients in the experimental group received additional planned teaching over a thirty-minute period by the researcher.

The data were gathered by means of a twenty-item questionnaire designed to elicit information regarding the self-medication behavior of the study population. The questionnaire was administered in the homes of the patients ten to fourteen days following their visit to the outpatient clinic.

Three hypotheses were tested in the study. Analysis of the data in relation to Hypothesis I indicated a

statistically significant difference in the number of self-medication errors in digoxin and diuretics made in a twenty-four-hour period by patients in the experimental group as compared with the control group. The experimental group made significantly fewer errors. Although patients in the experimental group made fewer errors of the four types of errors studied with regard to Hypothesis II, there was not a statistically significant difference in errors related to time, dosage and non-prescribed medications made in a twenty-four-hour period by patients in the experimental group as compared with the control group. There was, however, a statistically significant difference in the fourth type of error--that of omission. The testing of Hypothesis III showed a statistically significant difference in the level of knowledge of the two groups of patients. The experimental group had a higher level of knowledge of their medications.

The study concludes with consideration of implications for nursing practice and research.

86 pages

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Chapter 1

INTRODUCTION

I. INTRODUCTION TO THE PROBLEM

The general purpose of this study was to evaluate the effect of planned teaching on the self-medication practices of ambulatory cardiac patients over the age of forty-five years, who were living at home. Community nursing experience revealed to the researcher that errors in self-medication were made by patients living at home. The literature supported this observation. The medication regimen plays a vital role in the treatment of the ambulatory cardiac patient.[1]

The numbers of our population in the age group of forty-five years and over are increasing, and the leading cause of death in Canada of individuals in this age group is cardiovascular disease.[2] Therefore a study of the self-medication behavior of this segment of our population was deemed to be a timely and worthwhile endeavor.

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[1]Amy B. Hecht, "Self-Medication, Inaccuracy, and What Can Be Done," Nursing Outlook, Vol. XVIII, No. 4 (April, 1970), p. 30.

[2]Dominion Bureau of Statistics, Canada Year Book (Ottawa: Queen's Printer of Canada, 1970-71), p. 307.

II. STATEMENT OF THE PROBLEM

The specific purpose of this study was to compare the self-medication practices of two groups of ambulatory cardiac patients, age forty-five years and over, who were living at home and who attended an outpatient clinic for medical attention. All of the patients were taking digoxin 0.25 mgm. daily, and except for four patients, two from each group, they were also taking a diuretic. One group, the control group, was given the usual routine factual information which patients regularly receive when they visit the outpatient clinic. The other group, the experimental group, was given additional planned teaching regarding medications, by the researcher. This group was also encouraged to ask questions which the researcher answered. The comparison of self-medication practices was made in terms of:

1. number of self-medication errors made by individuals in each group
2. type of self-medication errors made by individuals in each group
3. level of knowledge of medication actions of individuals in each group.

III. SIGNIFICANCE OF THE PROBLEM

The numbers of our population in the age group of forty-five and over are increasing. In 1956 the population

of Canada in this age group was 4,009,914. In 1966 this figure was 5,097,447, an increase of 1,087,533 in ten years. In British Columbia the population in 1956 of individuals aged forty-five years and over was 411,096. In 1966 this figure was 541,068, an increase of 130,972 in ten years.[3]

The leading cause of death in Canada and in British Columbia of individuals age forty-five years and over is cardiovascular disease.[4] Many persons with a known diagnosis of cardiac disease have prescriptions of digoxin and diuretics. "Digoxin, despite its early origins, is an agent whose value is currently increasing rather than decreasing."[5] Health workers are becoming increasingly concerned with the extent to which patients take their medications, and how accurately they do so.[6] The patient's ability to take medications at home is an important determinant of the attainment of treatment goals.[7] Those patients who make errors in self-medication will not receive maximum benefit from their prescribed medications, or worse,

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[3]Ibid., p. 212. [4]Ibid., p. 307.

[5]Robert P. Walton and Peter C. Gazes, "Cardiac Glycosides II: Pharmacology and Clinical Use," Drill's Pharmacology in Medicine, ed. Joseph R. Dipalma (New York: McGraw-Hill Book Company, 1971), p. 780.

[6]Mary V. Marston, "Compliance with Medical Regimens: A Review of the Literature," Nursing Research, Vol. XIX, No. 4 (July-August, 1970), p. 312.

[7]Norman H. Berkowitz et al., "Patient Follow-Through in the Outpatient Department," Nursing Research, Vol. XII, No. 1 (Winter, 1963), p. 16.

suffer irreparable harm.[8]

> Practical experience has demonstrated that . . . alert and informed clinical attention is needed at all times in the administration of the singularly potent drug, digoxin.[9]

Encouraging patients to follow their physician's orders and recommendations is of concern to nursing. Nursing is one discipline considered essential to planning for, and implementing care for the individual in the community. Before planning care, the nurse must know the need. Schwartz says, "There is a recognized need for studies which will provide information about problems associated with self-medication of ambulatory patients."[10] She found that 59 percent of patients in a study of elderly ambulatory patients made self-medication errors. She then asked, "What about patients everywhere else?"[11] Hecht says, "It is a mistake to think that patients at home take their medications correctly."[12]

Caplan et al. studied the rank order of important variables for patient satisfaction in outpatient clinic

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[8]Hecht, op. cit., p. 31.

[9]Walton and Gazes, op. cit., p. 781.

[10]Doris Schwartz, Barbara Henley, and Leonard Zeitz, The Elderly Ambulatory Patient: Nursing and Psychological Needs (New York: The Macmillan Company, 1964), p. 109.

[11]Doris Schwartz, "Medication Errors Made by Aged Patients," American Journal of Nursing, Vol. LXII, No. 8 (August, 1962), p. 51.

[12]Hecht, op. cit., p. 30.

services. She found that the difficulty the patient has in following instructions for home treatment ranked second among the twenty-two variables identified by patients.[13] Self-medication is frequently the only home treatment which ambulatory cardiac patients must perform for themselves. This indicates a need for patient teaching.

"Patients with a long-term illness are reportedly more compliant if they are given careful instruction,"[14] says Davis, and Malone et al. report that "teaching is generally considered to be essential to the successful treatment of ambulatory patients."[15] "The teaching of patients has been accepted as an integral part of a nurse's function."[16] Methods of teaching patients about their medications must be explored.[17]

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[13]Eleanor Caplan and Marvin B. Sussman, "Rank Order of Important Variables for Patient and Staff Satisfaction with Outpatient Service," Journal of Health and Human Behavior, Vol. VII, No. 2 (Summer, 1966), p. 135.

[14]Milton S. Davis, "Variations in Patients' Compliance with Doctors' Advice: An Empirical Analysis of Patterns of Communication," American Journal of Public Health, Vol. LVIII, No. 2 (February, 1968), p. 275.

[15]Mary Malone, Norman H. Berkowitz, and Malcolm W. Klein, "The Paradox in Nursing," American Journal of Nursing, Vol. LXI, No. 9 (September, 1961), p. 53.

[16]Lois A. Monteiro, "Notes on Patient Teaching--A Neglected Area," Nursing Forum, Vol. III, No. 1 (1964), p. 26.

[17]Hecht, "Self-Medication, Inaccuracy, and What Can Be Done," p. 31.

IV. THE NEED FOR RESEARCH

Fox, in his article "A Proposed Model for Identifying Research Areas in Nursing," cites the need for studies in the area of nurse-patient teaching. He states:

> Investigations are needed to identify the need for teaching, . . . the methods of teaching, the effectiveness with which it is learned, and the extent to which it is acted upon.[18]

The need for studying patients in the older age group who are chronically ill is expressed by Mack. She says the number of sociological studies of older people are increasing. However, the group of older people who are chronically ill has been largely ignored in the existing research. This chronically ill older age group merits some special consideration from the research student.[19]

The need for a study of more effective use of waiting time of patients in an outpatient clinic is indicated in the statement:

> Systematic observation of thirty-one patients attending a clinic revealed that most of the patients spent forty-five minutes to one hour in the waiting room, and most spent this waiting time doing nothing.[20]

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[18]David J. Fox, "A Proposed Model for Identifying Research Areas in Nursing," Nursing Research, Vol. XIII, No. 1 (Winter, 1964), p. 34.

[19]Marjorie J. Mack, "The Personal Adjustment of Chronically Ill Old People Under Home Care," Nursing Research, Vol. I, No. 1 (June, 1952), p. 9.

[20]Evelyn R. Hayes, "Clinic Waiting Room Experience: An Exploratory Study," Nursing Research, Vol. XVII, No. 4 (July-August, 1968), p. 364.

It is suggested that educational experiences could be provided which might be effective in improving patient care.

There is a paucity of studies on the follow-up of self-medication practices of cardiac patients in their homes. One such study of forty patients on digoxin therapy reveals a lack of patient knowledge. The reason given by fourteen of the 26 patients who made errors of omission was, "I forget."[21] Another study of thirteen cardiac patients states the error of omission was the most frequent error made by these patients. The reasons they gave for the omissions were forgetting and interference with their activities. A summary of this study indicated eleven out of the 13 patients studied made errors in self-medication which played a vital part in their treatment, over a period of six weeks. An absence of health teaching was noted. Patients lacked information about the therapeutic effects of their medications. They were passive regarding their treatment, yet had a latent desire for self-sufficiency and increased knowledge.[22]

A need for research into the effectiveness of teaching a cardiac patient about medications is indicated.

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[21]Rita M. Brkich, "A Study to Determine how Patients View Their Digoxin Therapy" (unpublished Master's dissertation, McGill University, 1969), p. 28.

[22]Irene E. Nordwich, "Concerns of Cardiac Patients Regarding Their Ability to Implement the Prescribed Drug Therapy" (unpublished Master's dissertation, University of Western Ontario, 1970), p. 121.

Chapter 2

RESUMÉ OF PRESENT KNOWLEDGE

I. INCIDENCE OF SELF-MEDICATION ERRORS

The literature reveals numerous studies of the self-medication behavior of patients. Most patients studied lived at home. Few of these published studies investigated the self-medication behavior of cardiac patients.

Davis writes, "A review of the literature demonstrates a range of from 15 to 93 percent of patients reportedly non-compliant with medical regimens."[23] He says there are various populations and a variety of data collecting methods, but nevertheless a pattern emerges when these studies are examined as a whole. Regardless of differences, at least one third of the patients in most studies failed to comply with doctor's orders. He refers to both physician's treatment orders as well as to medication orders.

In a study done by Davis himself, he reports that no variation in patient compliance with medical regimens can be attributed to demographic characteristics peculiar

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[23]Davis, op. cit., p. 274.

to the patient such as age, sex, marital status and education.[24]

Marston writes that a review of the literature revealed little or no association existed between compliance behavior with regard to medical regimens and sex, education and socio-economic status.[25]

Male patients sixty-five years and under with cardiovascular disease were studied, and 30 percent of the study group admitted to some discrepancy in compliance with their medical regimen. "A patient generally does not accept everything his doctor recommends."[26] Responsibility to the patient is not completed with prescription.

A study involving twenty-six patients on a home care program revealed that sixteen of these patients failed to follow the medication regimen prescribed by their physicians. Evidence obtained from these patients while attending a clinic suggested the importance of clearly explaining medication regimens to all outpatients.[27]

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[24]Ibid., p. 278.

[25]Marston, "Compliance with Medical Regimens," p. 312.

[26]Milton S. Davis and Robert L. Eichhorn, "Compliance With Medical Regimens: A Panel Study," Journal of Health and Human Behavior, Vol. IV, No. 4 (Winter, 1963), p. 249.

[27]Elizabeth B. Curtis, "Medication Errors Made by Patients," Nursing Outlook, Vol. IX, No. 5 (May, 1961), p. 290.

Two studies, one of diabetic patients[28] and another of pregnant women taking iron pills,[29] revealed high self-medication noncompliance rates. No correlation was found between age and social class and number of errors made. Both researchers recommended more patient teaching as to the "what" and "why" of the medication prescribed.

In the western United States a study was done using a sample of fifty-nine patients who were sixty years of age and over. It was found that 59 percent of the patients made medication errors. The researchers emphasized that the consequences of medication errors and the increasing need to depend upon the patient to take medications at home, make it necessary to continue to concentrate on ways of identifying those patients who make errors, in order to attempt to reduce this percentage.[30]

A study of one hundred patients with pulmonary tuberculosis, showed that twenty-four of these patients were taking their drugs in an irregular fashion. "This irregularity may not allow the patient to respond to the

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[28]Julia Watkins, "A Study of Diabetic Patients at Home," American Journal of Public Health, Vol. LVII, No. 3 (March, 1967), p. 457.

[29]John Bonnar, A. Goldberg, and J. Smith, "Do Pregnant Women Take Their Iron?" The Lancet (March, 1969), p. 457.

[30]Elizabeth Neely and Maxine Patrick, "Problems of Aged Persons Taking Medications at Home," Nursing Research, Vol. XVII, No. 1 (January-February, 1968), p. 55.

medication therapeutically," states the researcher.[31] He feels that the cooperation of the patient in self-medication may be improved by explaining the course of the intended chemotherapy to the patient.

Two doctors studied fifty-nine children at a pediatric clinic in New York state. The study was done by interviewing the parents of the children and by inspection of the patient's medication containers. It was found that half the children on a ten-day course of penicillin stopped taking the drug by the third day. These researchers give two possible reasons for noncompliance with the medication regime. They felt perhaps the treatment or directions for therapy were not understood by the parents. Secondly, patients' relationship to the physician could be a large factor in determining cooperation in the medication regime.[32]

Hallburg found that 103 patients who were sixty years old and over, residing in San Francisco, and who had medications prescribed for the first time while visiting an outpatient clinic, had a relatively high noncompliance with prescribed medication regimens.[33]

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[31]Wallace Fox, "The Problem of Self-Administration of Drugs; with Particular Reference to Pulmonary Tuberculosis," Tubercle, Vol. XXXIX (October, 1958), p. 271.

[32]Abraham B. Bergman and Richard J. Werner, "Failure of Children to Receive Penicillin by Mouth," New England Journal of Medicine, Vol. CCLXVIII, No. 25 (June 13, 1963), p. 1337.

[33]Jeanne C. Hallburg, "A Decision Making Approach as a Teaching-Learning Strategy for Preparing Patients for Self Care" (unpublished Doctor's dissertation, University of California, 1969), p. 53.

II. THE TEACHING FUNCTION OF A NURSE

It no longer suffices to have an effective therapeutic drug if the patient refuses to take his medications as directed. Experimental programs for patients involving special education techniques are certainly warranted.[34]

Nurses accept teaching as a part of their function on the health team. In our contemporary society more and more responsibility for treatment of disease is being shifted from doctor, to nurse, to patient. "It may well be that the science of communication is more pertinent to nursing than the science of disease or pathology."[35]

Kos reports on the teaching of self-care to elderly patients with pacemakers. These patients commonly have digoxin and diuretics prescribed to improve heart action. Both their knowledge and medication-taking behavior improved with teaching. The study points out the need for nurses' involvement in teaching patients.[36]

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[34]David Berry, Alan Ross, and Kurt Deuschle, "Tuberculous Patients Treated at Home. Comparison of Regular and Irregular Self-Medication Groups," Review of Respiratory Diseases, Vol. LXXXVIII, No. 6 (December, 1963), p. 771.

[35]Dorothy M. Smith, "Myth and Method in Nursing Practice," American Journal of Nursing, Vol. LXVI, No. 1 (February, 1964), p. 70.

[36]Barbara Kos and Pamela Culbert, "Teaching Patients about Pacemakers," American Journal of Nursing, Vol. LXXI, No. 3 (March, 1971), p. 526.

Studies of planned instruction to patients in outpatient clinics suggest that this particular aspect of the nurses' role is idealized more than it is realized.[37] Health teaching is one effective method of assisting the patient to cope with present and future health problems. However, evidence exists that this approach to health care has only had sporadic support and emphasis.[38]

Patients expect nurses to help them meet the need for knowledge about their treatment. They are voicing their opinions more frequently and more vehemently.[39] As long ago as 1953, Streeter wrote, "Today it is essential that departments of nursing service conduct active teaching programs for patients . . . ."[40] "The nurse who increases her teaching function will assist the patient and his family to cope with their health problems more effectively."[41]

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[37]Jeanne C. Hallburg, "Teaching Patients Self-Care," Nursing Clinics of North America, Vol. V, No. 2 (June, 1970), p. 223.

[38]Arlene M. Putt, "One Experiment in Nursing Adults with Peptic Ulcers," Nursing Research, Vol. XIX, No. 6 (November-December, 1970), p. 492.

[39]Stella Hay and Helen Anderson, "Are Nurses Meeting the Patients' Needs?" American Journal of Nursing, Vol. LXIII, No. 12 (December, 1963), p. 97.

[40]Virginia Streeter, "The Nurse's Responsibility for Teaching Patients," American Journal of Nursing, Vol. LIII, No. 7 (July, 1953), p. 818.

[41]Margaret L. Pohl, "Teaching Activities of the Nursing Practitioner," Nursing Research, Vol. XVI (Winter, 1965), p. 5.

Attitudes of patients toward their medications can be influenced. Instruction by nurses cannot always alter lifetime attitudes, but several steps can be taken. "A method which is being tried out in some hospitals is self-administration of medications."[42] Such a program is being conducted in a rehabilitation hospital in a large urban centre on Canada's west coast. It is hoped that this program will give patients independence, and a preparation for their discharge to their homes and the task of self-medication.

> It has brought to the attention of the hospital staff, the great hazards involved to patients who are discharged to the home environment without the necessary training and instruction on the proper usage of drugs.[43]

Follow-up studies on these patients after discharge home have not been done.

III. THE ROLE OF THE NURSE IN THE OUTPATIENT CLINIC

Health services are undergoing rapid transformation. Prevention of illness and health maintenance in ambulatory clinics and in the patients' homes are being stressed.

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[42]Hecht, "Self-Medication, Inaccuracy, and What Can Be Done," p. 31.

[43]Mary Falconer, "An Experimental Program in Self-Medication," Canadian Pharmaceutical Journal, (May, 1971), p. 23.

More outpatient care is being considered.[44] The emphasis is on the practice of preventive medicine.[45]

Bennis et al. recommend that nurses be assigned to the outpatient clinic primarily to teach patients.[46] The nursing profession recognizes patient teaching as an important function of the nurse, yet, as this group of researchers has noted, "Much of our data has borne out the fact that pivotal as teaching is said to be, it is often a neglected area in practice."[47]

Fischer writes that social changes are making outpatient units more important than ever before and nurses must act before the full potential of these units can be realized. She adds that outpatient clinics have three functions, each of which implies a definite nursing responsibility. These are: treating the ambulatory sick, health teaching and research.[48]

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[44]Esther Lucile Brown, Nursing Reconsidered. A Study of Change (Toronto: J. B. Lippincott Company, 1970), p. 118.

[45]Based on a lecture by Dr. Stanley Block, Illinois Institute of Technology in Chicago, at the University of British Columbia, March 9, 1971.

[46]Warren G. Bennis et al., The Role of the Nurse in the Outpatient Department (New York: American Nurses' Foundation, Inc., 1961), p. 65.

[47]Ibid., p. 58.

[48]Mercedes M. Fischer, "Outpatient Departments Have a Long Way To Go," American Journal of Nursing, Vol. LXI, No. 8 (August, 1961), p. 56.

"Time is currently one of our society's most valued commodities."[49] It follows that time should be used wisely. Yet time spent by patients in waiting rooms of outpatient clinics is not being used effectively. Hayes suggests patient teaching would meet the needs of the patient and implement a more productive use of time.[50]

A student doctor who studied 150 patients at a medical outpatient clinic writes that 85 to 95 percent of these patients were satisfied with the information and explanation they received from the physician regarding their condition. He adds that 60 percent of these patients had an eighth grade education or less and these people often tend to be passive and to accept the care they receive without question or criticism.[51]

Sussman et al. state the less-educated and low-income patients tend to be most satisfied with the outpatient clinic.[52] Patient comments do, however, indicate a communication barrier in the doctor-patient relationship.[53] The outpatient department staff

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[49]Hayes, "Clinic Waiting Room Experience," p. 361.

[50]Ibid.

[51]Andrew W. Fisher, "Patients' Evaluation of Outpatient Medical Care," Journal of Medical Education, Vol. XLVI, No. 3 (March, 1971), p. 242.

[52]Marvin B. Sussman et al., The Walking Patient: A Study in Outpatient Care (Cleveland: The Press of Western Reserve University, 1967), p. 76.

[53]Ibid., p. 69.

underestimate the patients' eagerness for information.[54] These findings by Sussman et al. indicate not only the need for teaching by the clinic nurse, but also the receptiveness of the patient to such teaching.

"The nurse in the outpatient department is in a unique position to make a significant contribution to the total health-education program."[55] Windemuth asserts two reasons for this unique position of the nurse. The first is that the patient is in a state of readiness. The fact that the patient has made the effort to come to the clinic, indicates that he has a need which he wishes to have satisfied. The second reason given is the presence of the nurse in the clinic at a time when the patient is most interested in doing something about his health problem. And Windemuth adds, "Adults learn remarkably well."[56]

IV. SUMMARY

A review of the literature indicates that the frequency of noncompliance with prescribed medication regimens by patients in their homes is relatively high. The numerous studies include a wide range of settings, and a variety of numbers and types of medications per patient.

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[54]Ibid., p. 130.

[55]Audrey Windemuth, The Nurse in the Outpatient Department (New York: The Macmillan Company, 1957), p. 105.

[56]Ibid., p. 107.

Demographic characteristics of the patient such as age, sex, race, marital status, socio-economic status, education and medical diagnosis are also varied. Only two of these studies, one by Nordwich[57] and the other by Brkich,[58] described populations of cardiac patients and aspects of their digoxin therapy.

A consideration of paramount importance in most of these studies is the expression of the need for patient teaching by the nurse. The notion that "teaching is generally considered to be essential to the successful treatment of ambulatory patients"[59] cannot be over-emphasized. It permeates most of the literature reviewed. Interest in the teaching function of the nurse is long-standing, but only a limited number of studies of its practice and effectiveness are available in the literature.

The role of the nurse in the outpatient clinic reiterates a contemporary emphasis on preventive medicine and the importance of the teaching function of the nurse. In the clinic the nurse receives a receptive patient audience, with time to spare. This affords her the opportunity to make a significant contribution to the self-care of ambulatory patients in their homes.

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[57]Nordwich, "Concerns of Cardiac Patients."

[58]Brkich, "A Study to Determine how Patients View Their Digoxin Therapy."

[59]Malone, Berkowitz, and Klein, "The Paradox in Nursing," p. 53.

Chapter 3

THE DESIGN OF THE STUDY

I. GENERAL AIM OF THE STUDY

The general aim of the study was to compare the self-medication practices of two groups of ambulatory cardiac patients who were over forty-five years of age, and living at home. All of the patients were taking digoxin 0.25 mgm. daily, and except for four patients, two from each group, they were also taking a diuretic. The number and type of medication errors as well as the individual's level of knowledge about his medications were compared.

One group, the control group, was given the usual routine factual information which patients regularly receive when they visit the outpatient clinic. The other group, the experimental group, was given additional planned teaching regarding their medications, by the researcher.

II. SPECIFIC OBJECTIVES OF THE STUDY

1. To determine the number of errors in self-medication of digoxin and diuretics made by the experimental group as compared with the control group, in a twenty-four-hour period.

2. To determine the type of errors in self-medication of digoxin and diuretics made by the experimental

group as compared with the control group, in a twenty-four-hour period.

3. To determine the level of knowledge of self-medication of digoxin and diuretics of the experimental group as compared with the control group.

III. THE HYPOTHESES

Hypothesis I.

H_o There is no significant difference in the number of self-medication errors made in a twenty-four-hour period by members of the experimental group as compared with members of the control group.

Hypothesis II.

H_o There is no significant difference in the type of self-medication errors made in a twenty-four-hour period by members of the experimental group as compared with members of the control group.

Hypothesis III.

H_o There is no significant difference in the level of knowledge of self-medication of digoxin and diuretics, of members of the experimental group as compared with members of the control group.

IV. VARIABLES INCLUDED IN THE STUDY

The independent variable in the study was the planned teaching by the researcher. It was this variable

which purposely altered conditions in the study by its application to the experimental group.

The dependent variable was patient self-medication behavior. This criterion measured the effect of patient teaching. This measured effect was obtained from interviews with the entire study population ten to fourteen days after their visit to the clinic, by administration of the twenty-item questionnaire.

V. DEFINITION OF TERMS

Self-medication without error:

patient administers medication:

(a) ordered by his physician

(b) at the correct time

(c) in the correct dosage.

Self-medication error:

medication which is:

(a) taken by the patient and not prescribed by his physician

(b) ordered by the physician but not taken by the patient

(c) taken at the incorrect time

(d) taken in an incorrect dosage.

Type of medication error:

the different types of errors are:

(a) error of taking a medication not prescribed by the patient's physician

(b) error of omission

(c) error of taking a medication at the incorrect time

(d) error of taking a medication in an incorrect dosage.

Incorrect time:

medication is not taken by the patient O.D., B.I.D., T.I.D., or Q.I.D. as prescribed by his physician.

Incorrect dosage:

medication is not taken by the patient in numbers of tablets, capsules or spoonfuls as prescribed by his physician.

Level of knowledge:

in this study three levels of knowledge are considered: low, moderate and high. These levels pertain to knowledge of answers to the following questions:

(a) patient knows the trade names of the medications taken

(b) patient knows at what time the medications should be taken

(c) patient knows the effects of the medications taken

(d) patient knows the possible side-effects of the medications taken.

A low level of knowledge is signified by a knowledge of zero to one answer.

A moderate level of knowledge is signified by a knowledge of two answers.

A high level of knowledge is signified by a knowledge of three to four answers.

Routine information:

information regarding the patient's diagnosis and medications which is routinely given to patients who attend the outpatient clinic.

Additional planned teaching:

information and teaching regarding his diagnosis and medications given to the patient by the researcher. This consists of discussion with the patient over a thirty-minute period, during which the patient is also encouraged to ask questions.

Twenty-four-hour period:

that twenty-four-hour period of time immediately preceding the interviewer's visit to the patient's home.

VI. LIMITATIONS OF THE STUDY

1. The results of the study are dependent upon patient honesty and accuracy in responding to the questionnaire.

2. Because of the low socio-economic status of the patients in the study, and the geographic limitation that

they all live in the same large urban area, it is not possible to generalize results to the general population.

3. Most studies are never completely free of extraneous variables. Because of these limitations there can never be absolute certainty that the effects produced in an experiment would hold true for the target population when the findings are generalized.[60]

VII. ASSUMPTIONS

1. The assumption was made that patients were willing to admit to medication errors.

2. The assumption was made that the random assignment of patients to control and experimental groups would distribute any unreliability of responses randomly between the two groups.

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[60]Eugene Levine, "Experimental Design in Nursing Research," Nursing Research, Vol. IX, No. 4 (Fall, 1960), p. 205.

Chapter 4

METHODOLOGY

I. THE SAMPLE

The sample from which data were obtained was drawn from a population of patients who attended the outpatient clinic at a large urban hospital. Patients were randomly assigned to groups by alternately assigning those who met the criteria for sample inclusion, to the experimental and the control groups. The medical records of the patients were perused in order to obtain those who met the criteria for inclusion in the study. The criteria for the sample were: a diagnosis of cardiac illness, age forty-five years and over, being ambulatory, living at home, taking digoxin daily, and willingness to participate. The eligibility scale for the outpatient clinic limited the individual's income to $150.00 per month per person, with savings amounting to less than $1,000.00. Therefore the sample population consisted of patients of a low socio-economic status.

II. THE BIOGRAPHICAL DATA

The patients who met the criteria for inclusion in the study were met individually by the researcher as they

waited for their appointments with the doctors. A copy of the introduction to the patient is contained in Appendix A, page 68. After agreeing to participate, the patient was interviewed for biographical data in a private cubicle of the outpatient clinic. A copy of the biographical data form is contained in Appendix B, page 70. A date for the visit to the patient's home in ten to fourteen days was tentatively agreed upon.

III. THE PLANNED TEACHING

A copy of the semi-structured interview guide which the researcher followed in patient teaching is contained in Appendix C, page 72. The same format was followed in the thirty-minute discussion with each patient in the experimental group. A write-up of one such teaching discussion is contained in Appendix D, page 75. The patients were encouraged to participate in the teaching-learning situation by identifying goals of self-medication behavior, by choosing alternatives and by making their own decisions under the guidance of the researcher. Each patient was given a large calendar and a pencil, and instructed in the use of these items for indicating daily when a medication had been taken.

IV. THE QUESTIONNAIRE

Purpose of the Questionnaire

The overall goal for the data collection instrument was to obtain objective information about the relationship between the dependent variable of patient self-medication behavior in the home, and the independent variable of patient teaching. From these data comparisons were made between the experimental and control groups, and the three hypotheses were tested. A copy of the twenty-item questionnaire is contained in Appendix E, page 80.

Construction of the Questionnaire

The measurement of the results of the study in terms of its objective required the development of a data collection instrument, since none that could be applied to this study was available. Some of the items were based on a study by Schwartz, Henley, and Zeitz of elderly ambulatory patients.[61]

In designing the questionnaire, primary consideration was given to eliciting objective information regarding the self-medication practices of the patients in their homes. Other factors taken into account included the time and cost involved in data collection, the availability of the patients' charts in the outpatient clinic and the expected cooperation

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[61] Schwartz, Henley, and Zeitz, The Elderly Ambulatory Patient, p. 307.

by the patient in producing the medication containers for the interviewer during the home visit.

The sequence of the items of the questionnaire permitted a free-flow conversation which, although there was an orderly progression of necessary information received by the interviewer, allowed the patient to digress to his life experiences which frequently were unrelated to his medication regimen. It was felt that this would also help to control for possible bias in patient responses to the questions by helping to put the patient at ease. The questionnaire was designed to allow the patient to feel comfortable rather than interrogated. It consists of three pages. The chart on the third page, which the interviewer completed while eliciting responses to questions 3 to 13, simplified the data analysis process. Questions 14 to 20 were included in the questionnaire to add to the descriptive data of the study.

In order to eliminate possible bias by interviewers, the questionnaire contained no identification of the patient with regard to experimental or control group.

Pre-test of the Questionnaire

The questionnaire was pre-tested. Four patients were each visited in their homes twice, one week apart, in order to administer the tool. The wording, relevancy, precision and reliability of the questions were

tested.[62] The patients responded with identical scores upon re-administration of the questionnaire. Pre-testing therefore revealed that reliable data could be obtained.

A revision was made by deleting an item from the questionnaire. A question asking if the name of the medication was printed on the container was found to be unnecessary, since all patients obtained their medications at the outpatient clinic pharmacy which routinely printed the names on all medication containers.

Any doubt as to the willingness to cooperate on the part of the patients was dispelled. The four patients willingly produced the medication containers for the interviewer. Some did so before being asked. They answered the questions without hesitation. Where errors in self-medication were evidenced, the patients often seemed to be unaware of them.

The revised questionnaire was reviewed by the thesis committee.

The patients who participated in the pre-test were not included in the study.

Administration of the Questionnaire

In order to attempt to control for possible bias on the part of the researcher who also manipulated the

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[62]Faye G. Abdellah and Eugene Levine, Better Patient Care Through Nursing Research (New York: The Macmillan Company, 1965), p. 321.

experimental variable in the clinic setting, two outside interviewers, one of whom was a registered nurse and the other a pharmacist, each administered five questionnaires. This was done in the patient's home, ten to fourteen days after his visit to the clinic. The outside interviewers were not informed as to whether the patient was assigned to the experimental or the control group. Patient responses obtained by these interviewers were correlated with patient responses obtained by the researcher who visited the remaining thirty study patients in their homes, when the data were analyzed.

During the home interview the interviewer asked to see the containers of medications, and while carrying on the conversation, checked the labels to compare these instructions with the physician's orders taken from the patient's medical record at the outpatient clinic.

The questionnaire was administered in such a way so as not to impugn guilt if errors in self-medication were made.

Reliability, Validity and Practicability of the Questionnaire

"A measure is reliable if it is consistently reproducible."[63] Reliability is the degree to which a patient will respond with the same scores when a questionnaire is re-administered. It is a measure of a tool's

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[63]Levine, "Experimental Design," p. 208.

stability and consistency.[64] Responses from the four patients in the pre-test of the questionnaire were identical on both the first and second administration. Therefore reliability of the tool was deemed high.

Validity answers the question, "Does the instrument really measure what it is supposed to measure?" The questionnaire designed for this study did reveal errors in self-medication and voids in patient knowledge, which it was supposed to measure.

Levine states validity is related to relevance. If statistical tests show significant results, do these results actually have a practical significance in real life?[65] It is felt that a study whose data-gathering tool reveals that a significantly higher number of errors in self-medication are being made by patients, where these patients have not been exposed to teaching about their medications, is of practical value in real life. Patient teaching is a function of the nurse. Teaching a patient about his medications is not necessarily a difficult task. Errors in self-medication of digoxin can result in real harm to the patient as Walton and Gazes point out when they write:

> Inadequate dosage commonly is followed by the return of the conditions of heart failure. Excessive dosage is followed by toxic effects with arrhythmias and as a final stage, heart standstill.[66]

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[64] Abdellah and Levine, op. cit., p. 322.

[65] Levine, loc. cit.

[66] Walton and Gazes, "Cardiac Glycosides II," p. 780.

And Jankowski says, "Obviously, the margin between the therapeutic dose and the toxic dose of digitalis is quite narrow, compared with most drugs in common use today."[67] With regard to diuretics, Grollman writes:

> The potent, commonly used diuretics are not self-limited in action. This is particularly true in patients with congestive heart failure, . . . where overuse of diuretics may increase disability and even prove fatal.[68]

According to Fisher:

> . . . the simple precaution of randomization will suffice to guarantee the validity of a test of significance, by which the result of the experiment is to be judged.[69]

The sample population in this study was randomly assigned into two groups. The above statement would imply that the tests of significance were valid.

The practicability of a tool is measured by its reasonableness in cost, in time and in ease of administration.[70] The questionnaire was readily administered by reading the twenty items to the patient and recording the patient responses. This could be done in less than twenty

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[67]Norman W. Jankowski, "Digitalis: I Never Know Where I Stand With It," Patient Care Clinical Concepts (March 15, 1970), p. 89.

[68]Arthur Grollman, "Diuretics," American Journal of Nursing, Vol. LXV, No. 1 (January, 1965), p. 89.

[69]R. A. Fisher, The Design of Experiments (7th ed.; London: Oliver and Boyd, 1960), p. 21.

[70]Vivian Wood, "Understanding Psychometric Tests," The Canadian Nurse, Vol. LXI, No. 4 (April, 1965), p. 282.

minutes. The cost of the forms was nominal. The time and cost of travel to the patient's home must also be considered. The simplified method of data analysis on page 3 of the questionnaire makes it an efficient and practicable tool for the researcher.

V. METHOD OF DATA ANALYSIS

"An important characteristic of all scientific activity is the measurement."[71] Having numerical data serves a useful purpose since quantification enhances the objectivity of the interpretation of results. Numbers are less ambiguous than language.[72]

In this study the data were discrete values. The chi-square test of significance was used to determine the difference between the number and type of self-medication errors, and the difference in levels of knowledge between the two groups of patients. Yates' correction for continuity was applied where indicated.[73] The computations were performed manually.

In order to perform statistical tests of significance, the hypotheses were stated in the null hypothesis

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[71]Walter R. Fuchs, Cybernetics for the Modern Mind (New York: The Macmillan Company, 1971), p. 58.

[72]Levine, op. cit., p. 206.

[73]Donald R. Shupe, "On the Use of Chi-Square in Nursing Research," Nursing Research, Vol. XVI, No. 3 (Summer, 1967), p. 282.

form. The .05 level of significance was accepted as statistically significant. The decision to accept the .05 level was made before the study was begun.

Some of the data were also analyzed descriptively. Tables and graphs were drawn to illustrate comparisons.

Chapter 5

ANALYSIS OF THE DATA

I. THE STUDY POPULATION

A total of forty ambulatory male and female cardiac patients comprised the study sample. Forty-four patients initially agreed to participate in the study when they came for clinic appointments on Tuesday mornings during the months of November, December, and January. Four were subsequently not included in the study. One man from the experimental group was hospitalized before he could be visited at his home ten to fourteen days after visiting the clinic. Another man from this group was omitted from the study because the home visit revealed that a close family member administered his medications and also became his spokesman during the interview. In the control group one man was also hospitalized, and a woman who had initially stated she was willing to participate in the study, later refused to permit the interviewer to visit her at her home. She was the only patient to refuse to participate, although each patient was told he could withdraw from the study at any time if he so desired.

During the initial patient interview in the outpatient clinic, an emphasis on the patient's medications

was avoided by expressing an interest only in how he was getting along at home. It was felt that this approach would help to avoid bias in the study. After completion of the biographical data form, no further conversation was held with patients in the control group. Those patients who had been assigned to the experimental group, returned for a thirty-minute planned teaching discussion with the researcher after seeing the doctor.

The medical records of patients in both groups were obtained after the patients had been seen by the doctor, in order to transcribe the list of prescribed medications to the biographical data form. In many instances this list of medications was unchanged from previous orders, but in some cases changes were made in orders of long-standing. Only oral medications were considered in the study. All of the forty patients were taking digoxin. Thirty-six patients, eighteen from each group, were also taking a diuretic. The two most commonly prescribed diuretics were Lasix and Hydrochlorothiazide. A list of the less common diuretics and all other medications prescribed for these patients is contained in Appendix F, page 84. Nitroglycerine, analgesics, somnerifics and laxatives were routinely prescribed as p.r.n. orders and were not included in the study.

A pharmacy was located in the outpatient clinic. Patients obtained their medications here without cost. The names of the drugs as well as amounts and times to be

taken were clearly printed on the containers. This enabled the interviewers to check the containers during the home visit.

The patients in the experimental group returned willingly to talk with the researcher after seeing their doctors. The time involved did not seem to be a concern to them. Most talked freely about their cardiac conditions and appeared interested in learning more about them and about their medications.

All three interviewers were accepted into the homes of the patients. Only one refusal was encountered. During the home visit a free-flow interview took place eliciting information about the patients' self-medication behavior by following the twenty-item questionnaire. Most patients did not appear to recognize that the purpose of the visit was to check on their self-medication behavior. They talked freely about their health, the outpatient clinic, their medications and other life experiences. It seemed that where errors became apparent to the interviewer, the patients themselves were often not aware that errors had occurred, except in the case of omissions. Almost every patient appeared reluctant to see the interviewer leave, and thanked her for having come to visit.

II. SUMMARY OF THE DATA

Details of the background of patients in the experimental and control groups are shown in Tables 1 and 2.

Table 1

Sex, Age, Living Arrangement and Total Number of Medications of Patients in the Experimental Group

Patient	Sex	Age	Living arrangement*	Total number of medications
1	M	67	A	3
2	M	64	A	3
3	M	66	S	4
4	M	64	A	2
5	F	74	O	3
6	M	62	A	4
7	M	65	A	3
8	M	66	S	5
9	F	78	O	4
10	M	67	A	2
11	F	66	S	3
12	M	77	O	2
13	M	61	A	2
14	M	69	A	3
15	M	69	O	3
16	F	85	A	3
17	F	59	A	7
18	M	60	A	3
19	M	80	A	2
20	M	89	A	3
		$\bar{X}$ = 69.4		$\bar{X}$ = 3.2

*A = living alone
S = living with spouse
O = living with other adults.

Table 2

Sex, Age, Living Arrangement and Total Number of Medications of Patients in the Control Group

Patient	Sex	Age	Living arrangement*	Total number of medications
1	F	65	S	3
2	M	59	A	5
3	M	80	O	3
4	M	78	A	3
5	M	88	O	3
6	M	82	O	4
7	F	71	A	3
8	M	56	A	4
9	F	75	A	3
10	F	77	S	4
11	M	61	S	5
12	F	82	O	2
13	M	72	O	2
14	M	67	A	3
15	F	82	O	3
16	F	79	S	3
17	M	53	S	2
18	F	58	A	3
19	F	69	A	8
20	M	71	A	4
		$\bar{X}$ = 71.3		$\bar{X}$ = 3.5

*A = living alone
S = living with spouse
O = living with other adults.

In the experimental group of twenty patients, five were female. The control group of twenty patients consisted of nine females and eleven males. The average age of the experimental group was 69.4 years, while the average age of the control group was 71.3 years.

In the experimental group, thirteen patients lived alone, three lived with their spousesand four lived with married children or other adults. In the control group, nine patients lived alone, five lived with their spousesand six lived with married children or other adults. The average number of medications prescribed per patient in the experimental group was 3.2, while in the control group it was 3.5 medications per patient.

The percentage distribution of self-medication errors in digoxin and diuretics, and other medications, and the average level of knowledge of digoxin and diuretics, and other medications, of both the experimental and control groups are shown in Figure 1. The figure shows the inverse relationship between patient self-medication errors and patient level of knowledge about his medications and their effects. The entire experimental group made a total of three errors (which represent 15 percent of the total number of errors made by all forty patients studied) in self-medication of digoxin and diuretics in a twenty-four-hour period, while the control group made seventeen errors (which represent 85 percent of all errors made by the entire study population). In other medications the experimental group

made a total of six errors (which is 27.3 percent of all errors made by the forty patients studied) during the same period, while the control group made sixteen errors (or 72.7 percent of all errors made by the entire study population.

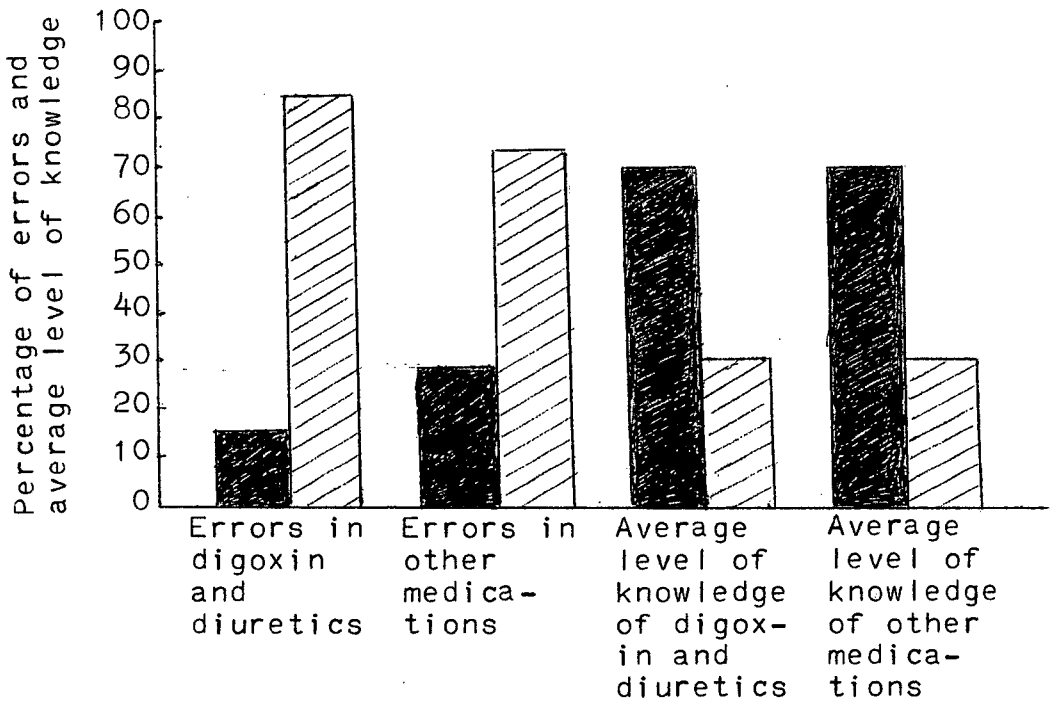

Figure 1

Percentage Distribution of Self-Medication Errors in Digoxin and Diuretics, and Other Medications, and Average Level of Knowledge of Digoxin and Diuretics, and Other Medications, of Both Experimental and Control Groups

The patient's level of knowledge was established by the asking of four questions concerning his medications. Therefore, the patient who knew the correct answers to all four questions would have a level of knowledge of 4. The

average level of knowledge of digoxin and diuretics of the experimental group was 2.7 (which represents 69.2 percent of the possible level of knowledge of 100 percent) while for the control group it was 1.2 (which represents 30.8 percent of the possible 100 percent). The average level of knowledge of other medications taken by the experimental group was 2.5 (which is 69.1 percent of the possible level of knowledge of 100 percent) while for the control group it was 1.1 (or 30.9 percent of the possible 100 percent).

The number and percentage of types of self-medication errors of medications other than digoxin and diuretics made by both groups are shown in Table 3.

Table 3

Number and Percentage of Types of Self-Medication Errors in Medications Other Than Digoxin and Diuretics Made by Both Groups

Type of error	Experimental group N = 20		Control group N = 20	
	Number of errors	Percentage of total errors	Number of errors	Percentage of total errors
Omission	1	16.6	4	25.0
Not prescribed	3	50.0	2	12.5
Improper time	1	16.7	7	43.7
Incorrect dosage	1	16.7	3	18.8
Total	6	100.0	16	100.0

The type of self-medication error of other medications which was made by most patients in the experimental group was

taking a medication not prescribed by the doctor. In the control group most patients made the error of taking the medications at the improper time. Both groups made few errors in incorrect dosage. The experimental group made one error of omission while the control group made four errors of omission.

In this category of medications, some common prescriptions such as potassium preparations were often ordered by the doctor to be taken four times a day (Q.I.D.), while digoxin and diuretics were usually only daily orders (O.D.). However, the control group made approximately the same number of errors in taking digoxin and diuretics (seventeen errors) as in taking other medications (sixteen errors). The experimental group made twice as many errors in self-medication of other medicines as in self-medication of digoxin and diuretics.

The number of patients in both groups who made self-medication errors in the total medication regimen, with regard to age group, and mean number of errors per patient in each age group, are shown in Table 4.

In both groups, most errors per patient in the total medication regimen, were made by the 61-70 age group. None of the errors made by the experimental group were made by patients under sixty years of age or over eighty years of age. In the control group, patients in these two age groups did make errors. In each of the four age groups the

Table 4

Number of Patients in Both Groups who Made Self-Medication Errors in the Total Medication Regimen, with Regard to Age Group, and Mean Number of Errors per Patient in Each Age Group

Age Group	Experimental Group N = 20			Control Group N = 20		
	Number of patients	Number of errors	Mean number of errors per patient	Number of patients	Number of errors	Mean number of errors per patient
50-60	2	0	0	4	8	2.00
61-70	12	7	0.55	4	9	2.50
71-80	4	2	0.50	8	12	1.25
81-90	2	0	0	4	4	1.00
Total	20	9	$\bar{X}$ = 0.52	20	33	$\bar{X}$ = 1.68

experimental group made fewer average errors per patient than did the control group.

The percentage distribution of self-medication errors in the total medication regimen of both experimental and control groups with regard to living arrangements, is shown in Figure 2. Most errors in self-medication in the total medication regimen in both groups were made by patients who lived alone. In the experimental group 55.5 percent of the errors made by the group were made by patients who lived alone. They made five of the total of nine errors made by this group. Only 11.1 percent of errors made by the experimental group were made by patients who were married and lived with their spouses, while 33.4 percent of total number errors made were made by patients who lived with married children or other adults.

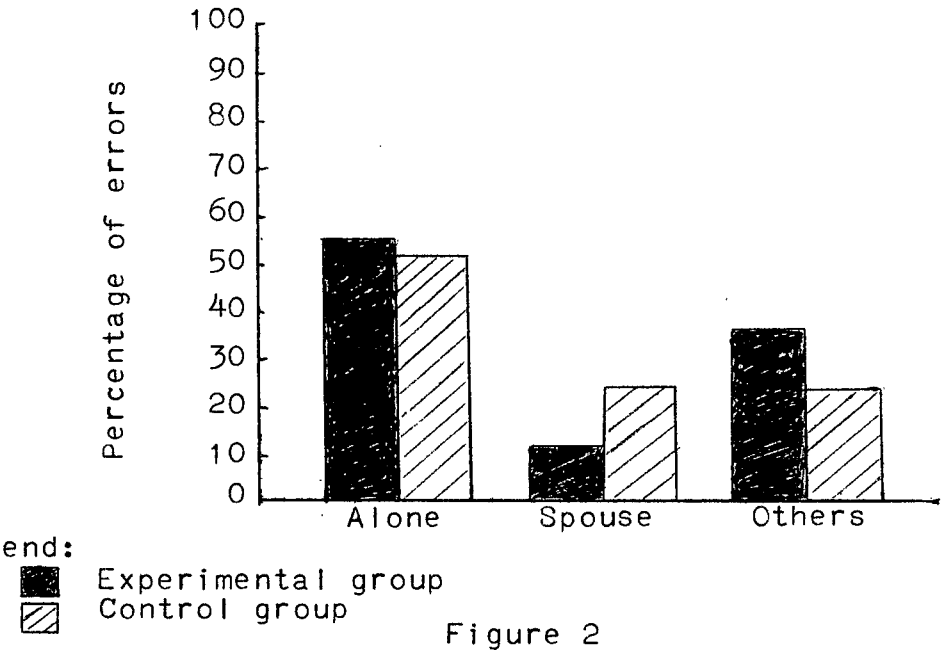

Figure 2

Percentage Distribution of Self-Medication Errors in the Total Medication Regimen of Both Experimental and Control Groups with Regard to Living Arrangements

In the control group, those patients who lived alone made 51.5 percent of all errors made by the group. They made eighteen of the total of thirty-three errors made by the control group. Those patients who lived with their spouses made 24.4 percent of all errors made by the control group while 24.1 percent of all errors were made by patients who lived with married children or other adults.

The sex of the patient was not a significant factor in self-medication errors in either the experimental or the control group. Males and females made similar numbers and types of errors.

Patients who had a large number of medications prescribed for them by their physicians made no more errors than did patients with only two or three medications. This was true in both the experimental and control groups.

Most patients were not visited by public health nurses in the community. Two patients stated they received weekly injections from a community nurse.

The reason most frequently given by patients for forgetting to take medications was, "I get busy doing something and then I forget." They did not appear to dislike taking their medications, but many patients stated they would like to know more about the effects of the medications.

In summary, patients in the control group made more self-medication errors than those in the experimental group and they had a lower level of knowledge about their

medications. In both groups, the two categories of patients who made the most errors were those in the 61-70 year age group, and those who lived alone.

In order to check for possible bias of the researcher, who also manipulated the independent variable of planned teaching of the patients in the experimental group, one fourth of the total sample home interviews were conducted by two outside interviewers. Table 5 shows that sixteen of the 20 patients in the experimental group were interviewed by the researcher. Three of these patients (18.75 percent) made errors in self-medication of digoxin and diuretics. Four of the 20 patients in this group were interviewed by the outside interviewers. None of these patients (0 percent) made errors.

In the control group, the researcher interviewed fourteen of the 20 patients. Nine of these patients (64.29 percent) made errors. The two outside interviewers visited six of the 20 patients. Four of these patients (66.67 percent) made errors.

III. ANALYSIS IN RELATION TO HYPOTHESIS I

The experimental study was designed to test three hypotheses. The first hypothesis was:

H_0 There is no significant difference in the number of self-medication errors made in a twenty-four-hour period by members of the experimental group as compared with members of the control group. The chi-square test of

Table 5

Number and Percentage of Patients in Both Groups Who Made Self-Medication Errors in Digoxin and Diuretics as Evidenced by the Three Interviewers

	Experimental Group N = 20			Control Group N = 20		
Interviewer	Number interviewed	Number who made errors	Percentage who made errors	Number interviewed	Number who made errors	Percentage who made errors
Researcher	16	3	18.75	14	9	64.29
Outside interviewers	4	0	0	6	4	66.67

significance employing a 2 x 3 contingency table and Yates' correction for continuity was applied to the data on number of errors to determine the significance of the difference between the number of errors made by the experimental group as compared with the control group. The statistical formula is contained in Appendix G, page 86. This formula was also applied in testing hypothesis III.

Table 6

Number of Self-Medication Errors of Digoxin and Diuretics Made Per Patient by Both Groups

Number of errors per patient	Experimental group	Control group
2	0	4
1	3	9
0	17	7
Total number of patients	20	20

$N = 40$ $\quad d.f. = 2$

$\chi^2 = 7.72$ $\quad p < .05$

A chi-square value of 7.72 was obtained. This result permitted the rejection of the null hypothesis at the .05 level. There was a significant difference between the number of self-medication errors of digoxin and diuretics made by the experimental and control groups.

IV. ANALYSIS IN RELATION TO HYPOTHESIS II

The second hypothesis was:

H_o There is no significant difference in the type of self-medication errors made in a twenty-four-hour period by members of the experimental group as compared with members of the control groups.

Table 7

A. Number of Self-Medication Errors of Taking Non-Prescription Medication Made by Both Groups

Non-prescription error	Experimental group	Control group
Yes	1	2
No	19	18
Total number of patients	20	20

$N = 40$ d.f. = 1
$\chi^2 = 1.40$ $p \geq .05$

The chi-square test of significance employing a 2 x 2 contingency table and correction for continuity was applied to the data on all four types of errors made by both groups of patients. The statistical formula is contained in Appendix G, page 86.

A chi-square value of 1.40 was obtained. This result did not permit the rejection of the null hypothesis at the .05 level. There was no significant difference between the number of errors of taking a non-prescribed

medication made by the experimental group as compared with the control group.

Table 8

B. Number of Errors of Omission in Self-Medication of Digoxin and Diuretics Made by Both Groups

Error of omission	Experimental group	Control group
Yes	0	6
No	20	14
Total number of patients	20	20

$N = 40$ $\quad d.f. = 1$
$\chi^2 = 4.90$ $\quad p < .05$

There was a significant difference in number of errors of omission of digoxin and diuretics made by the experimental group as compared with the control group.

Table 9

C. Number of Errors of Improper Time in Self-Medication of Digoxin and Diuretics Made by Both Groups

Error of improper time	Experimental group	Control group
Yes	2	6
No	18	14
Total number of patients	20	20

$N = 40$ $\quad d.f. = 1$
$\chi^2 = 1.41$ $\quad p > .05$

There was no significant difference between the number of errors of taking digoxin and diuretics at the improper time made by the experimental group as compared with the control group.

Table 10

D. Number of Errors of Incorrect Dosage in Self-Medication of Digoxin and Diuretics Made by Both Groups

Error of incorrect dosage	Experimental group	Control group
Yes	0	3
No	20	17
Total number of patients	20	20

$N = 40$ d.f. = 1
$\chi^2 = 0$ $p > .05$

There was no significant difference between the number of errors of incorrect dosage of digoxin and diuretics made by the experimental group as compared with the control group.

V. ANALYSIS IN RELATION TO HYPOTHESIS III

The third hypothesis was:

H_o There is no significant difference in the level of knowledge of self-medication of digoxin and diuretics, of members of the experimental group as compared with members of the control group.

Table 11

Level of Knowledge of Self-Medication of Digoxin and Diuretics of Both Groups

Level of knowledge	Experimental group	Control group
Low	3	14
Moderate	5	4
High	12	2
Total number of patients	20	20

$N = 40$ d.f. = 2
$\chi^2 = 11.66$ $p < .01$

There was a highly significant difference in the level of knowledge of self-medication of digoxin and diuretics, of the experimental group as compared with the control group.

VI. SUMMARY OF RESULTS OF DATA ANALYSIS

Examination of the data revealed that a statistically significant difference existed between the experimental and control groups of ambulatory cardiac patients, in the number of self-medication errors in digoxin and diuretics made in a twenty-four-hour period, and in the level of knowledge about these medications. This was determined by chi-square analysis, using the .05 or better level of significance as the fixed level. The patients in the experimental group made significantly fewer errors in self-medication and their level of knowledge was significantly higher, in comparison with the control group. Hypotheses I and III were therefore rejected.

The difference in errors of taking non-prescribed drugs, time and dosage was not statistically significant, although the experimental group did make fewer errors of these three types. The only type of error which showed a statistically significant difference between the two groups was the error of omission. Significantly fewer patients in the experimental group made errors of omission. Hypothesis II was rejected only in part B and accepted in parts A, C, and D.

Chapter 6

SUMMARY, IMPLICATIONS FOR NURSING PRACTICE, AND RECOMMENDATIONS FOR FURTHER STUDY

I. SUMMARY

This experimental study was designed to evaluate the effect of planned teaching on the self-medication practices of ambulatory cardiac patients over the age of forty-five years. These patients were all taking digoxin, and all except four were also taking a diuretic. They lived at home and received medical attention at an outpatient clinic in a large hospital in western Canada. They were from a low socio-economic level of our society. The total sample comprised forty male and female patients divided randomly into a control group, who received only the usual routine information during their visit to the outpatient clinic, and an experimental group, who were given additional planned teaching regarding their medications by the researcher.

A review of the literature was conducted in relation to incidence of self-medication and total medical regimen errors of ambulatory patients in their homes; the teaching function of the nurse; and the role of the nurse in the outpatient clinic.

The data were collected in the patients' homes ten to fourteen days after the visit to the outpatient clinic,

by means of a twenty-item questionnaire designed to reveal information related to the three hypotheses of the study. The criterion measure of self-medication behavior was based on the number of deviations in self-medication, the types of deviations, and the level of knowledge of the patients.

The results indicated that there was a statistically significant difference in the number of self-medication errors in digoxin and diuretics made in a twenty-four-hour period by patients in the experimental group, as compared with the control group. The experimental group made significantly fewer errors. Although the patients in the experimental group made fewer errors of the four types of errors studied, there was not a statistically significant difference in errors of time, dosage and non-prescribed medications made in a twenty-four-hour period by patients in the experimental group as compared with the control group. There was, however, a statistically significant difference in the fourth type of error--that of omission. A statistically significant difference was shown in the level of knowledge of patients in the experimental group as compared with the control group. The experimental group had a higher level of knowledge about their medications.

II. IMPLICATIONS FOR NURSING PRACTICE

The rising incidence of chronic and long-term diseases requires that patients have an understanding of their conditions and treatments. Understanding by

> patients can lead to increased cooperation with the therapeutic regimen . . . [74]

The results of this study revealed an increased cooperation with the self-medication regimen by those patients who had been given planned teaching about the effects of their medications. Because medications play a vital role in the treatment of ambulatory patients living at home, the practice of nursing should consider a greater involvement in patient teaching. Hospitalized patients may be given instructions on self-care and medication regimens as a preparation for discharge home. The study may provide some direction for patient teaching in outpatient clinics. The teaching of patients in their own homes by community health nurses may derive some impetus from the study.

It is not implied that patients are not presently being instructed in self-care and medication regimens. It is however suggested that a greater emphasis might be placed on these areas of nursing practice.

In discussing the implications of the findings reported in this study, it is important to emphasize the limitations of the study group, both geographically and socio-economically. The study group, in this case, was restricted to residents of a large urban area, and they were of low socio-economic status. All were over the age of

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[74]Mary Lock Palm, "Recognizing Opportunities for Informal Patient Teaching," The Nursing Clinics of North America, Vol. VI, No. 4 (December, 1971), p. 669.

forty-five years and had a diagnosis of cardiac conditions. Consequently the study has limited generalization potential. Nevertheless, the findings are of considerable interest to nursing, and could serve to stimulate in members of the nursing profession a greater sensitivity and consciousness of the role of the nurse as a patient teacher.

Perhaps no less important than the statistical significance of the patient self-medication behavior reported in this study, was the rewarding personal experience encountered by the researcher. Most patients were interested in discussing their medication regimen, and they also seemed most appreciative of the interest expressed in their health problems. The experience suggests that a greater involvement in patient teaching can lead to increased job satisfaction for nurses.

III. RECOMMENDATIONS FOR FURTHER STUDY

". . . One of the hallmarks of rigorous research is the strict control over variables."[75] In behavioral science research, the human subject can contaminate the results. Yet strict controls can alter the "real life" situation. As Argyris points out, "Rigorous research has its own blind spots."[76]

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[75]Chris Argyris, "Issues in Evaluating Laboratory Education," in Marvin D. Dunnette, John P. Campbell, and Chris Argyris, "Symposium: Laboratory Training," Industrial Relations, Vol. VIII, No. 1 (October, 1968), 1-45, p. 33

[76]Ibid., p. 36.

> . . . we have to discriminate between the weight to be given to scientific opinion in the selection of its methods, and its trustworthiness in formulating judgments of the understanding.[77]

Analysis of the data in this study revealed that patient knowledge was inversely related to self-medication errors. This would indicate that planned patient teaching decreases self-medication errors. Although self-medication errors decreased as patient knowledge increased, there may have been other factors involved. The linguist, Hayakawa, says, "The meanings of words are not in the words, they are in us."[78] Warmth, or lack of it, and attitude toward the patient are possible extraneous variables. The content of the patient teaching must also be considered. The amount of consideration given to the patient's understanding of, and attitude toward, his illness is important. His health behavior is conditioned by his subjective perception of the situation based on his needs and goals. In this study each patient given instruction was also given a calendar and a pencil in order to guide his self-medication behavior. Therefore the researcher does not feel justified in concluding that patient teaching alone reduces errors in patient self-medication.

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[77]Chris Argyris, "A Rejoinder to Dunnette and Campbell," in Marvin D. Dunnette, John P. Campbell, and Chris Argyris, "Symposium: Laboratory Training," Industrial Relations, Vol. VIII, No. 1 (October, 1968), 1-45, p. 45.

[78]S. I. Hayakawa, Language in Thought and Action (New York: Harcourt, Brace & World, Inc., 1949), p. 292.

The following recommendations are made for further investigation:

1. Replication of this study in order that support for the findings about the effects of patient teaching might be gained if a consistent difference between the two groups of patients were obtained.

2. Studies of patient self-medication compliance which consider various approaches to patient teaching. Attitudes and patterns of communication may help to explain compliance and noncompliance. The three hypotheses of this study are worth testing in broader studies.

3. Studies of the effect of patient teaching on the self-medication behavior of groups of patients other than cardiac patients.

4. Studies of the effect of patient teaching on patient self-care behavior in areas other than that of self-medication.

5. A study of the effectiveness of group teaching as compared to individual patient teaching.

6. A study of the effectiveness of informal teaching as compared to formal planned patient teaching.

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APPENDIX A

INTRODUCTION TO THE PATIENT

INTRODUCTION TO THE PATIENT

My name is Gertrude Goodman. I am a registered nurse.

Information is being collected from people who visit the outpatient clinic to see how they are getting along at home. This is an effort to provide improved care for you.

If it is all right with you, either I or another person will visit you at your home in two weeks or less. We will ask you questions about how you are getting along. From this visit we hope to learn how we can improve the health care you receive.

Will you help?

APPENDIX B

BIOGRAPHICAL DATA FORM

BIOGRAPHICAL DATA FORM

E.__

Name_____ C.__

Address_____(near)_____

Telephone_____

Sex. M__ F__

Marital Status. S__ M__ W__ D/S__

Living Arrangements. alone__ spouse__ children__ other adults__

Age_____

Birth Date_____

Religion_____

Education. Elementary___ High school___ College___

Race_____

Employment_____ or Retired_____

Date of O.P.D. visit_____

Planned dates for home visit_____, _____

Preferred time of day for visit_____

List of medications	Amount prescribed	Time prescribed
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

APPENDIX C

SEMI-STRUCTURED INTERVIEW GUIDE FOLLOWED IN PATIENT TEACHING

SEMI-STRUCTURED INTERVIEW GUIDE FOLLOWED IN PATIENT TEACHING

Introduction:

Do you feel helped after visiting the outpatient clinic?

What do you think helps you the most?

Do your medicines help?

You feel then that they are an important part of your treatment?

Is it important to take them regularly?

Type of Medication Error:

Do you find you take them at a specified time, or does this time vary?

Do you often forget to take them?

Do you take your medicines in the exact amounts ordered by the doctor and as printed on the containers?

Are there medicines which you take which help you, and which were not ordered by the doctor?

Discussion:

Sometimes people feel they would like to be told more about their condition. Do you?

Do you feel you would like to discuss in more detail your health as well as your medicines with a nurse?

What in particular interests you in this regard? (Discuss patient's condition with him/her.)

Knowledge:

Do you know the names of your medicines? (Go over them with patient.)

Do you know what time of day to take them?

Are you interested in how each one acts on your body, i.e. what it does for you? (Review actions with patient.)

Do you think some of these medicines may have side effects if not taken as directed?

What are some of these? (Discuss side effects with patient.)

Patient Feedback and Decision-Making by Patient Under Guidance of Nurse: (Incorporate all above conversation)

Identify the goals; e.g. To take medicines as prescribed.

Consider the relevant data; e.g. Does he forget?
Eyesight.
Importance of taking medications.

Identify and evaluate alternatives; e.g. Set alarm.
Use calendar.
Keep medications on table.

Select alternative; e.g. This is done by patient.

APPENDIX D

A TEACHING DISCUSSION WITH A PATIENT

A TEACHING DISCUSSION WITH A PATIENT

KEY: P = patient R = researcher

R: Do you feel helped after visiting the outpatient clinic?

P: Yes, I think so.

R: In what way are you helped?

P: I don't know. Well, the pills help me.

R: You feel then, that the medicines you take are an important part of your treatment?

P: Yes, I do.

R: Is it important to take them regularly?

P: I guess so.

R: Why do you think so?

P: I don't know.

R: Taking your medicine regularly would mean that your body has a certain amount of the medicine in it at all times. Then it helps you. This is desirable.

P: Yes, I suppose it is.

R: Do you find that you take your medicines at the same time everyday, or does the time vary?

P: It varies sometimes.

R: Why?

P: I don't always get up at the same time in the morning.

R: Yes, that's understandable. Do you often forget to take them?

P: No. I would say no. I've forgotten about three times since last September. That's not often.

R: What about the amount you take. Do you take the exact amounts ordered by the doctor, and which are printed on your containers?

P: Yes.

R: Do you read the labels on the containers?

P: Yes.

R: Are there medicines which you take which help you, which the doctor did not order?

P: Well, I don't know. I take wheat germ pills. Are they good?

R: Yes, I think probably they are. However, it would not be wise to take pills other than vitamins, minerals or laxatives unless you discussed this with your doctor and he ordered them.

P: No.

R: Sometimes people feel they would like to be told more about their condition. Do you?

P: No. I'm old. I'm eighty years old. It doesn't matter about me.

R: But if you really believed that you wouldn't come here would you?

P: Well, I guess not.

R: Would you like to know more about your heart condition?

P: No, not really.

R: No?

P: No, the doctors know what they're doing.

R: What about the nurses? Do you ever ask them?

P: No, I never have.

R: I think they might answer questions about your medicines if you had any questions. It may be good to know for yourself, since the doctor cannot always be with you. Is there anything you would like to ask me about them?

P: No.

(Pause)

R: Do you know the names of your medicines?

P: There is "di-oxygen" for the heart and then a water pill.

R: Yes, the little white pill for the heart is digoxin. It's like three little words put together; dig ox in --digoxin.

(Patient repeats this several times with difficulty.)

Do you know what the water pill is called?

P: No, I have it here in this bottle.

R: Hydrochlorothiazide.

(Patient never does master the pronounciation of hydrochlorothiazide.)

What does digoxin do for you?

P: It helps the heart work.

R: Yes. In what way?

P: I don't know.

R: Well, it slows the heart beat and it strengthens the heart beat. Those are two important things digoxin does.

P: Aha.

R: And the hydrochlorothiazide--the water pill?

P: It makes me go to the bathroom.

R: Yes, you pass more water. With the water you also lose salt. This can take away any swelling of your fingers or ankles. Have you had this?

P: Oh yes, my ankles used to be bigger, (pulls up pantlegs) and now they are O.K. The pills really helped me.

R: Do you think your medicines could have bad effects if you did not take them as ordered?

P: I don't think so.

R: If a person took twice as many as he should, would nothing happen?

P: Well, maybe. I never would do that.

R: No, I'm sure you wouldn't. But supposing another person did, what might happen?

P: Ah--go to the bathroom all the time?

R: Yes, and he might feel sick to his stomach, or very sleepy, or very weak. Taking too much digoxin for one's system could also make a person feel sick to his stomach. It could also make white colors look yellowish or blurred. Has this ever happened to you?

P: No.

R: If it ever does, you will know the cause. Then you could get in touch with your doctor.

P: Yes, that's good to know.

R: Yes, I believe it is. If one understands both the good and bad effects of a medicine, one can tell when he should see his doctor.

P: Yes.

R: We were saying earlier that your medicines play an important part in keeping you feeling well. Would you think then that they should be taken as prescribed--as written on the containers for you?

P: Yes.

R: What things can you think of that could keep you from taking them at the right time and in the right amounts?

P: I do as it says. I don't often forget them.

R: I have a large calendar, with a pencil, here. If you feel it would help you remember, you can write your medicines in on each day and tick off when you have taken them.

P: Thank you. I don't think I need it.

R: Well, keep it anyway. I give one to each person I talk to here. If you ever feel it might be of help, then you'll have it.

P: Thank you. You know, I keep my pills on the table and I always know where they are.

R: Yes. I have enjoyed talking with you. I will see you then on Monday, in two weeks, at your home.

P: Yes. I'll be home.

APPENDIX E

THE QUESTIONNAIRE

QUESTIONNAIRE

1. What medicines do you take regularly?_____

_____

2. May I see the containers of medicines? I need to check the labels.
3. How often do you take each one? (Go over each medication separately for Questions 3, 4, 6, 9, 10, 12 and complete table on page 3.
4. At what time did you take this one today?
5. If "no" - why did you not take it?_____
6. At what time did you take it yesterday?
7. Do you take it at these times everyday, or does the time at which you take it vary?_____
8. Why does the time vary?_____
9. How much do you take each time?
10. Does every medicine you take help you? What do you think it does for you?
11. Could any of these medicines have any side effects?_____

_____

12. If "yes" - could you think of side effects which would cause you to contact the doctor?
13. Do you take any medicines not prescribed by the doctor?

_____

14. Sometimes people forget to take their medicines. Do <u>you</u> ever forget to take your medicines?_____
15. If "yes" - why?_____

16. Does anyone assist you in taking the medicines?_____

17. Are you visited by a public health nurse?_____

18. What things do you not like about taking your medicines?

_____

19. Do you feel that you are told as much as you want to know about each medicine?_____

20. If "no" - what kinds of things would you like to know about your medicines?_____

Name:

Address:

Date Visited:

Interviewer:

	Name of medicine	Amount Prescribed	Time Prescribed	How often taken	Time Today	Time taken Yest.	Amount taken	What does it do?	Side effects
	QUESTIONS			3	4	6	9	10	12
CARDIAC	1.								
	2.								
	3.								
	4.								
	5.								
OTHER	6.								
	7.								
	8.								
	9.								
	10.								

Name:
Address:
Date visited:
Interviewer:

Analysis of Results
A. Digoxin & Diuretics
B. Other

3,4,6. Omission
A.
B.
4,6. Incorrect time
A.
B.
9. Error in amount
A.
B.
13. Not prescribed
A.
B.

Total Number of Errors:
A.
B.

Patient Knowledge
1. Name of medication
A.
B.
10. Effect of medication
A.
B.
12. Side effects
A.
B.
3. When medication should be taken
A.
B.

Level of Knowledge
A.
B.

APPENDIX F

LIST OF ALL MEDICATIONS PRESCRIBED FOR THE STUDY POPULATION

LIST OF ALL MEDICATIONS PRESCRIBED FOR THE STUDY POPULATION*

aldactone
aldomet
allopurinol
amesec
beminal plus
chloropropamide
colchicine
coumadin
diamox
dicoumerol
digoxin
dilantin
donnatol
elavil
hydrochlorothiazide
hydrodiuril
hygroton
KCl elixir
lasix
paramettes
peritrate
phenobarb
propanalol
slow K
tetracycline
thyroxine
tolbutamide
quinidine
valium

*List includes generic and trade names. Medications are listed as the physician prescribed them.

APPENDIX G

STATISTICAL TREATMENT OF THE DATA

STATISTICAL TREATMENT OF THE DATA

1. The chi-square test of significance for Hypothesis I employed the formula:

$$\chi^2 = \sum \frac{[(o-e) - .5]^2}{e}$$

The level of significance of .05 or better was fixed as statistically significant for all three hypotheses.

2. The chi-square test of significance for Hypothesis II employed the formula:

$$\chi^2 = \frac{N[(ad-bc) - \frac{N}{2}]^2}{(a+c)(b+d)(a+b)(c+d)}$$

3. The chi-square test of significance for Hypothesis III employed the formula:

$$\chi^2 = \sum \frac{[(o-e) - .5]^2}{e}$$