LEARNER CONTROL AS A PATIENT TEACHING VARIABLE WITH PERSONS TAKING CARDIAC MEDICATIONS

by

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CHAPTER I

INTRODUCTION

Historically patient education has been assumed to be a part of nursing care. More recently the professional organization, the American Nurses Association (1975), has made this claim more explicit by publicly stating that patient-teaching is an integral part of professional nursing care. Although nurses working with patients in the hospital setting often incorporate health-relevant information as part of patient care, it has not been documented that the information given is generally well-planned or systematically administered. Several obstacles to effective patient teaching by nurses are cited in anecdotal literature. Frequently cited are the lack of time or attention in the practice setting for teaching and a lack of familiarity with educational methods or with the preparation and evaluation of the teaching materials. Additionally, nurses appear to lack sufficient knowledge of specific therapeutic regimens to effectively teach in certain areas. One important area of patient teaching is medication regimens which requires detailed technical knowledge on the part of the teacher. In regard to medication teaching, the study by Markowitz, Pearson, Kay, and Loewenstein (1981) pointed out that nurses, as well as pharmacists and physicians, are not entirely knowledgeable about drugs in current use. Along with the need for accurate and current knowledge, this study highlighted the need for information that is presented in a planned, deliberate manner for effective patient education.

Recently, health professionals have been made aware of the urgent need to inform patients regarding their care through the American Hospital Association's (1975) "Patient's Bill of Rights." Included in this statement is the right of patients to know about their prescribed medications. The purpose is to help patients become responsible health consumers and thereby safe self-managers of their medication regimens. In order for persons to accomplish safe self-care, instruction will generally be needed.

The plan for instruction requires consideration of the learner. McWeeny (1980) describes patient education rights to be considered during the teaching-learning process as:

> (1) the right to accurate information; (2) the right to be taught as unique learners; (3) the right to learn what they want to know; (4) the right to accept or reject patient teaching; and (5) the right to expect quality education. (p. 84-87)

However, most patient teaching has been incidental and unplanned, thereby failing to meet these educational rights.

A major area of teaching of persons with chronic illness is related to medication taking. Persons with one or more chronic illnesses often take several medications and are susceptible to a variety of problems resulting from drug regimens, including drug interactions and toxicity (Williamson, 1980). Drug interactions and toxicity reactions may be a result of misinformation about or mistakes in medication administration. The potential for drug regimen problems is further complicated by the

fact that many of the chronically ill are also elderly. Poor vision, decreased hearing and mental confusion over medication directions can affect the way older persons take their medications (Donahue, Girlon, Baumler, Moerhlin, & Strayer, 1981). Persons with chronic illness need clear medication instruction which considers visual and hearing difficulties as well as specific disabilities associated with their chronic illness.

The aim of the present study was to compare systematic strategies of patient medication teaching which were based upon learning principles for the adult learner. The learning concept of particular interest was the effect of learner control over the content and process of instruction.

Conceptual Framework

One of the problems in characterizing the process of instruction is the lack of an organized taxonomy of instructional methods (Cronbach & Snow, 1977). Features such as the pace, method or style of instruction are commonly cited and studied. Knowledge about the teaching process could be enhanced if the underlying dimension along which methods vary is identified. One dimension along which methods can vary, suggested by Snow (1980) as a promising significant variable, is the degree of learner control.

Control by the learner in the instructional process takes many forms and can differentially affect the learning outcomes. Snow (1980) places learner control on a continuum varying from complete control to no control over the educational process. When the learner has complete

control over the goals, content, method, pacing, sequence, timing and evaluation, Snow labeled the process as the "adult scholar model" (p. 153). Snow further describes the adult scholar model as "the ideal toward which one hopes each learner will strive" (p. 153). On the opposite end of the continuum, the "child robot model" (p. 153) is characterized by the learner having no control over the aforementioned aspects of the educational process. This undesirable condition, Snow states, "is unfortunately still characteristic of some elementary schools" (p. 153). Snow states further that the focus of research should be between the two extreme ends of the continuum "in which goals are prescribed but instruction is to some extent individualized, so methods, media, and content (i.e., treatments) are to some extent variable" (p. 153). In Table 1 the model of learner control includes examples of teaching methods of the present study. It is adapted from the continuum of learner control described by Snow.

Within this range advocated by Snow (1980), the highest point on the continuum representing the greatest degree of learner control in instruction, are innovative educational methods, one of which was used in the Maastricht study, for example. In the Maastricht study, medical students were allowed control over all conditions of learning except the goals. The students worked on case problems for four weeks while they were allowed to use whatever resources they wished to facilitate meeting the goals set for them. The high degree of learner control allotted should accommodate individual differences and enhance learning in these adult students.

Table 1

Continuum of Learner Control

Model	Degree of control by learner over goals and teaching method	Example of teaching method
ADULT SCHOLAR	Complete control of goals and teaching method	Self-actualization
*Patient teaching alternatives	Complete control over teaching method only	Innovative (Maastricht study)
	High degree of control over teaching method only	Learner preference Interactive computer (BIP) **Self-directed
	Medium degree of control over teaching method only	**Decision-making
	Varying degree of control (between medium and low) over teaching method	One-to-one lecture-discussion Programmed instruction
	Low degree of control over teaching method	**Lecture
CHILD ROBOT	No control over goals or teaching method	Remedial

* Adapted from Snow, 1980. p. 154.
** Teaching strategies of the present study.

The preference studies reviewed by Snow (1980) further illustrate strategies of greater learner control in instruction. In these studies the learners were allowed to choose their preferred method of instruction after sampling several methods. Learners with a choice of method are expected to do better than those assigned a teaching method. In Table 1 the preference studies are placed toward the top of the continuum which designates a high degree of control over the teaching methods by the learner.

A high degree of learner control was present in an interactive computer program (BIP) reviewed by Snow (1980). In this situation students did not choose the instructional method but learners had control over their time and work schedules, which included requests for assistance, changes in tasks, and termination of assignments. The features of time and change in task were viewed by Snow as having high learner control and thus this study was placed toward the top of the continuum in Table 1.

The self-directed strategy, in a high position on the learner control continuum in Table 1, refers to the learner who is given access to several forms of audiovisual materials to review. Gagne (1975), an educational psychologist, emphasizes that the use of audio and visual media allows the instruction to meet the individual needs of students. In patient education there are several benefits of media-assisted instruction. Since the materials can be left with the patient, there are few scheduling concerns (Bille, 1981). The same content is provided to each patient in the same manner and thus is not dependent on the

varying teaching capabilities of the health professionals (Bille, 1981). A multisensory--visual, auditory, and touch--approach to learning enhances learning (Bille, 1981). By having a selection of audiovisual materials available, boredom is reduced when information is repeated. Learning has been shown to be reinforced by such repetition (Bille, 1981). The self-directed strategy in the present study allowed the most learner control possible to hospitalized patients with chronic cardiac illness.

In the intermediate position on the control continuum is the decision-making strategy (Hallburg, 1969) of the present study. In this approach the teacher and learner share control in the instructional process. The decision-making strategy like the self-directed strategy, is compatible with Knowles' (1978) andragogical learning theory which emphasizes the mutual participation between the adult learner and the teacher in the learning process. Throughout the teaching process, the teacher and learner share in the formation of objectives, in the process of inquiry, in the exploration of the adult's experiences as a learning resource and in the application of the new learning to the adult's experience. This type of interaction between the nurse (teacher) and patient (learner) is also advocated by other nurse researchers in patient education (Bille, 1981; Redman, 1976). The decision-making strategy described by Hallburg (1969) is a specific example of a discussion method implemented with outpatients with various medical problems. Through the learner's participation in the decision-making process, it is believed that the learner's knowledge will be enhanced and his medication regimen followed as prescribed.

One-to-one or individual instruction by a nurse (teacher) is often described in the patient education literature. This strategy is usually administered by using a combination of lecture and discussion methods of instruction. Because individual instruction usually allows for little learner control, it is placed toward the lower end of the control continuum in Table 1. However, it is difficult to determine the specific aspects of instruction in which the learner is allotted control as this intervention is usually not standardized and it allows the teacher great flexibility in its administration.

In programmed instructional methods, the learner is allotted control only over the pace of the learning and is expected to respond to the teaching content (Snow, 1980). This method is placed in the lower degree of learner control on the continuum in Table 1.

The lecture method which allows the least learner control is located near the bottom of the continuum in Table 1. This method was implemented in the presented study. It is an efficient and highly structured means to communicate information from the teacher to the learner (Gall & Gall, 1976; Redman, 1976). However, it does not ensure that the learner is actively thinking about the information, especially if the learner does not ask questions. The lecture is one of the most passive instructional activities for the learner (Bille, 1981; Gall & Gall, 1976). For the above reasons, one would not expect this teaching method to be the most effective for most learners.

In summary, several examples of different educational methods, including those of the present study, were presented and discussed in

relation to the degree of control each method allotted the learner. A model of the learner control continuum adapted from Snow (1980) was presented. Normal, healthy students have comprised the majority of the learners who have been the recipients of these diverse educational methods, especially methods which allowed higher degrees of learner control. The decision-making strategy has been specifically defined and researched for the teaching of older adult persons with chronic illness. Older persons with chronic illness may have impaired memory and a decreased ability to learn. Teaching methods which elicit participation by both the teacher and learner, such as the decision-making method, may offer an optimal approach to convey instructional material. The goals of learning are carefully structured and mutually agreed upon by the teacher (nurse) and learner (patient). As the needs of the older person with chronic illness are identified through mutual interchange in the decision-making strategy, the teacher (nurse) and learner (patient) adjust the content and teaching process accordingly. For these reasons, the decision-making method with a moderate degree of control by the learner may offer the most effective method for the chronically ill person to learn. This proposition forms a major tenet of the present study.

Review of the Literature

This review of the literature pertains to medication teaching programs, especially for hospitalized cardiac patients, and examines the degree of learner control allotted in the various teaching strategies. The possible effects of the degree of learner control on the knowledge

acquisition and retention outcomes are discussed. Attention was also directed to selected variables of the instructional process which affect the interpretation of the findings of the studies and include the following: (1) the knowledge test instruments; (2) the length of instruction; (3) combination teaching methods; (4) written materials; (5) repetitive instruction; (6) schedule for teaching; and (7) characteristics of the learners in relation to locus of control. A summary of the studies is presented in Table 2.

Learner Control in Instruction

The degree of learner control allotted in the instructional process was difficult to determine because of the diverse nature of the teaching strategies that were implemented in the patient teaching literature and because the researchers did not describe the teaching strategies in terms of learner control. The teaching strategies in the literature review used different instructional methods, materials and combinations of each to impart information. The patient teaching studies included in Table 2 appeared to use teaching methods which ranged from a high degree of control to lower degrees of learner control over the process and content of instruction.

Under certain circumstances, a high degree of learner control can be allowed in strategies which implement audiovisual materials and methods. When used routinely, audiovisual programs have a major advantage of communicating the same information to each person in a consistent manner. Fewer staff are needed to implement this strategy. Depending on the specific manner of implementation, the degree of

control allotted the learner in audiovisual strategies can range from a low degree where the teacher controls the selection, timing, pace, sequence and repetition of the audiovisual program to a high degree where the learner has control in the specific choice of the audiovisual format of instruction from a variety of instructional materials and methods in addition to the aforementioned aspects of instruction.

In the study by Barbarowicz, Nelson, DeBusk, and Haskell (1980) a high degree of learner control may have been allotted the experimental subjects in the selection, timing, pace, sequence and repetition of the slide/tape programs and written materials. However, since the researchers did not specifically describe the strategy in terms of learner control, it is not definitely known whether the learners actually had control over these aspects of instruction. The experimental subjects were compared to subjects who received the hospital's usual, unstructured teaching from a nurse who allowed a varying degree of learner control. The experimental group had greater increases in knowledge acquisition than the comparison group. Differences between the groups in knowledge retention continued at the one and three month clinic visits.

A strength of the Barbarowicz, et al. (1980), study, as noted in Table 2, was that a large number of cardiac subjects were randomly assigned to each group. Limiting factors of the study included the following: (1) the knowledge test was repeated at all four test administrations increasing the possibility for test sensitization, (2) the reliability and validity of the knowledge instrument was not

Table 2

Review of Adult Patient Teaching Studies from 1969 to 1981

Author, Year	Subjects	Teaching Content	Teaching Strategy	Instruments	Results	Comments
Hallburg, 1969	Medical outpatients. Experimental Ss N=52 Control Ss N=51 Alternately assigned.	Prescribed medication regimen. Name, dose, purpose, frequency, & way(s) to remember medication.	Experimental treatment: one-to-one decision-making approach with nurse. Control: clinic routine.	Home interview.	No significant differences between groups in knowledge.	Medications taught varied from S to S. Experimental treatment allotted medium learner control.
Hecht, 1974	Tuberculosis patients. Experimental Ss: Group I N=12 Group II N=12 Group III N=6 Control Ss N = 17 Nonrandom assignment.	Medication teaching. Name, dose, purpose, & side effects of each medication. Ways to remember medication. Importance of compliance. How to achieve congruence between medication regimen and lifestyle.	Experimental treatment: One-to-one lecture-discussion of 5-15 minutes by nurse. Not standardized. Written materials. Group I: 1 clinic session. Group II: 2 clinic sessions. Group III: 1 hospital, 1 clinic, & 2 home sessions. Control: clinic routine.	Two home interviews at 2 & 4 weeks. Urine tests. Pill counts.	Teaching decreased overall percent errors & percent serious errors. As amount & intensity of teaching increased, percent errors uniformly decreased. Statistical significance not achieved.	Small group sizes. Home interview repeated. Experimental treatment allotted varying learner control.
Deberry Jefferies, & Light, 1975	Hospitalized patients with myocardial infarction and/or congestive heart failure. N=29 No control group.	Cardiac medication(s). Name, dose, purpose, appearance, action, & side effects of medication. Frequency of administration. Indications for notifying physician. Safety in administration.	One-to-one lecture-discussion by nurse. Written materials. Number of drugs: 1-4. Number of sessions: 1-8. Session: 15-30 minutes for each medication.	Identical knowledge pre & posttests. 6 items per drug. Responses recorded by tester.	All Ss increased in knowledge scores at posttest. Not tested for statistical significance. Minimum individual gain 33.3%.	Number and kind of cardiac medications varied from S to S. Instruction repeated to some Ss. Knowledge test repeated. Treatment allotted varying learner control.

Table 2 (continued)

Author, Year	Subjects	Teaching Content	Teaching Strategy	Instruments	Results	Comments
Rahe, Scalzi, & Shine, 1975	Hospitalized patients with myocardial infarction. N=24 No control group.	Cardiac disease & factors in the therapeutic regimen: activity, diet, smoking, medications.	One-to-one lecture-discussion by nurse. Written materials. Several sessions over week. Instruction not standardized.	Identical pre & post knowledge test. 49 closed questions with 2 on medications.	Two-tailed student t-test showed a significant ($p < .05$) increase from pre to posttest scores.	Medication teaching content not detailed. Knowledge test repeated. Treatment allotted varying S control.
Bille, 1977	Hospitalized patients with myocardial infarction. Experimental Ss: N=12. Control Ss: N=12. Nonrandom assignment.	Cardiac disease. Self-care. Risk factors.	Experimental treatment: one-to-one lecture-discussion by nurse from objectives. Written materials. Control: hospital routine.	Knowledge posttest at discharge only. 40 questions: closed items & fill-in-blanks. Effort given to establishing reliability & validity of test.	No significant difference between groups in knowledge.	Medication teaching & testing content not detailed. No way to equate group equivalence prior to teaching. Varying learner control allotted experimental Ss.
Bracken, Bracken, & Landry, 1977	Hospitalized patients with myocardial infarction. Lecture treatment: N=31. Videotape treatment: N=45. Nonrandom assignment.	Cardiac disease & factors in the therapeutic regimen: diet, risk factors, medications, lifestyle changes, symptoms.	Lecture treatment: 4 lectures by health professionals from teaching manual. Videotape treatment: 1 program available 4 times daily. 4 different programs on 4 consecutive days. Same health professionals as lecture. One-to-one discussion following treatments.	Identical pre & post knowledge test. Closed questions.	Significant attrition in both groups. No difference in knowledge scores between groups.	Medication teaching & testing content not detailed. Videotape strategy allowed more S control than Lecture. Both were lower degrees of learner control. Knowledge test repeated.

Table 2 (continued)

Author, Year	Subjects	Teaching Content	Teaching Strategy	Instruments	Results	Comments
Soflin, Young, & Clayton, 1977	Hospitalized cardiac patients. Experimental Ss: N=7. Control Ss: N=8. Random assignment.	Digoxin Medication. Name, dose, purpose, appearance, action, side effects, timing, & frequency. Indications for notifying physician. Safety in administration. Congestive heart failure: signs, symptoms, definition, & management.	Experimental treatment: slide/tape program conducted by pharmacist. Control: hospital routine.	Identical pre & post knowledge tests. Test items: 27 closed questions. Posttest items reordered.	Significant difference ($p < .001$) between the means of posttest scores with experimental group showing most gains.	Detailed teaching & testing content. As implemented, experimental treatment allotted low S control. Knowledge test repeated. Reliability & validity of knowledge test not reported.
Haggerty, Berardi, Young, & Kimberlin, 1978	Hospitalized cardiac patients. Four groups of 10 Ss each. Random assignment.	Digoxin medication. Congestive heart failure. (As in Soflin, et al., 1977.)	Group I treatment: Commercial slide/tape with pharmacist present. Group II: Commercial slide/tape. Group III: Pharmacist-prepared slide/tape with pharmacist present. Group IV: Pharmacist-prepared slide/tape. Individual instruction. Commercial slide/tape 6 minutes. Pharmacist-prepared slide/tape 20 minutes.	Knowledge posttest. Test items: 25 closed questions. Effort given to establishing reliability & validity of test.	No significant differences found between four groups on knowledge scores by ANOVA.	Detailed teaching & testing content. Allotted low S control.

Table 2 (continued)

Author, Year	Subjects	Teaching Content	Teaching Strategy	Instruments	Results	Comments
Guzzetta, 1979	Hospitalized male patients with myocardial infarction. Three groups of 15 Ss each. Random assignment.	Cardiac disease. Factors in the therapeutic regimen: medications, diet, activity, risk factor modification, psychological problems.	One-to-one lecture-discussion by nurse from outline. Written materials. 3 sessions on 3 consecutive days. Session 1 hour. Group I: Ss taught on days 3, 4, 5, post CCU. Group II: Ss taught on days 7, 8, 9. Group III: Ss taught on days 11, 12, 13.	Identical pre & post knowledge test. 40 closed questions. Effort given to establishing reliability & validity of test.	Grand mean gain score for all Ss was significant ($p < .05$) by t-test. Higher gain score in group taught 7-9 days after CCU than groups taught 3-5 & 11-13 days.	Medication teaching & testing content not detailed. Knowledge test repeated. No group not taught. Varying learner control allotted.
Linde & Janz, 1979	Hospitalized patients with valve replacement (N=30) or coronary artery bypass surgery (N=18). No control group.	Specific cardiac disease & surgery. Factors in the therapeutic regimen: activity, diet, medications, warning signs, risk factor modification, special concerns.	One-to-one lecture-discussion by nurse. 5-6 sessions of 20-25 minutes each. Written materials. Content reviewed after posttests.	Identical knowledge test for pretest & posttests at discharge, 1, & 3 month clinic visits. Test items: closed questions & listing of each cardiac medication by name, dose, & purpose. Some closed questions reordered on posttests.	Pretest to posttest scores significantly ($p < .01$) increased. Remained significantly increased from pretest scores on 1 & 3 month posttests.	Medication teaching & testing content limited. Knowledge test repeated. Varying learner control allotted.
Norell, 1979	Outpatients with glaucoma. Experimental Ss N=35. Control Ss N=38. Random assignment.	Glaucoma disease & factors in the therapeutic regimen. Importance of pilocarpine medication and compliance.	Experimental treatment: 30 minute tape/slide program. Written materials. One-to-one lecture-discussion & medication tailoring interview with assistant. Control: clinic routine.	Medication monitoring device. Baseline recording for 20 days for both groups. After experimental treatment, both groups recorded for additional 20 days.	Change in proportion of missed doses among experimental Ss was significant ($p < .01$). Experimental Ss missed fewer doses.	No knowledge testing. Medication teaching content not detailed. Varying to medium control allotted S.

Table 2 (continued)

Author, Year	Subjects	Teaching Content	Teaching Strategy	Instruments	Results	Comments
Rankin, 1979	Hospitalized patients with myocardial infarction. Group I: N=11 Group II: N=8 Random assignment.	Warfarin medication. Action, directions, & precautions in taking. Laboratory tests.	Group I treatment: Programmed instruction booklet. Group II: American Heart Association pamphlet.	Two knowledge tests for posttest at discharge & mailed test 3 weeks after discharge. 14 closed questions. Effort given to establishing reliability & validity of tests & programmed instruction booklet.	Group I had significantly ($p < .005$) greater knowledge scores on posttests at discharge. Group I had significantly ($p < .025$) greater knowledge scores 3 weeks later. Scores increased in Group II by test 3 weeks later.	Warfarin teaching & testing content briefly described. Question if content the same to each group. Both treatments allotted lower degree of learner control. Ss had opportunity to consult on mailed home test.
Sechrist, 1979	Hospitalized patients. N=2 Outpatients. N=39. Experimental Ss: N=17. Control Ss: N=24. Random assignment.	Antibiotic medication. Name, dosage, precautions, side effects, & administration method.	Experimental treatment: Two one-to-one lecture-discussion sessions by nurse. Each session 10 minutes & 20-40 minutes apart. Control: One 10-minute one-to-one lecture discussion by nurse.	Knowledge test for posttest only. 9 open-ended questions. Tester recorded answers. Pretested tool.	Significant difference between the means of posttest scores ($p < .01$) with experimental group greater. 9.6% of variation in groups explained by education level.	Detailed antibiotic teaching & testing content. Education level greater in experimental Ss. Varying learner control allotted.
Barbarowicz, Nelson, Debusk, & Haskell, 1980	Hospitalized patients having coronary artery bypass graft surgery. Experimental Ss: N=106. Comparison Ss: N=93. Random assignment.	Cardiac disease & surgery. Factors in the therapeutic regimen: medications, diet, activity, smoking cessation, risk factor & stress management.	Experimental treatment: 5 to 7 slide/tape programs individually administered 12-20 minutes each program. Written materials. Comparison treatment: one-to-one lecture-discussion by nurse. Not standardized.	Identical knowledge tests for pretest & posttests at discharge, 1, & 3 months.	Knowledge scores increased in both groups. Mean score increases of experimental Ss significantly ($p < .001$) greater than increased mean scores of comparison Ss. Experimental Ss knowledge scores remained greater at 1 & 3 months.	Medication teaching & testing content not detailed. Knowledge test repeated. Experimental treatment allotted perhaps a higher degree of learner control. Comparison treatment allotted varying learner control. Question if comparison Ss had access to same content.

Table 2 (continued)

Author, Year	Subjects	Teaching Content	Teaching Strategy	Instruments	Results	Comments
Milazzo, 1980	Hospitalized male patients with myocardial infarction. Experimental Ss Group I: N=9 (pre- & posttested) Group II: N=8 (posttested only) Control Ss: N=8 (pre & posttested). Random assignment.	Cardiac disease & factors in the therapeutic regimen. Risk factors, activity, medication, & danger signals.	Experimental treatment: one-to-one slide/lecture by nurse. 45 minutes. Control: hospital routine.	Identical pre & post knowledge test. 20 closed questions.	Significant ($p < .05$) increase found in posttest scores of experimental Ss compared to control Ss.	Medication teaching & testing content not detailed. Low learner control allotted in experimental treatment.
White, Lemon, & Albanese, 1980	Hospitalized patients. Group I: Control of non-cardiac Ss N=55. Group II: Cardiac Ss before catheterization. N=128. Group III: Cardiac Ss after cardiac surgery. N=58 (Ss from Group II with 18 Ss pretested). Group IV: Cardiac surgery Ss in rehab. N=38 (Ss from Group III). Random assignment.	Cardiac disease & factors in the therapeutic regimen. Medication, diagnostic tests, risk factors, & psychological factors.	One-to-one lecture-discussions by different health professionals at different times. Written materials. Not standardized.	Identical knowledge test for pretest & posttests at discharge & in rehab. clinic. 36 closed questions with 3 items on medications. Questions reordered on posttests.	Ss tested after cardiac surgery did not score significantly higher than pretest scores. Stastically significant ($p < .02$) gain in rehabilitation scores compared to pretest scores.	Medication teaching content not detailed. Fragmented instruction. Knowledge test repeated. Uncertain if Ss the same throughout. Varying learner control allotted.
Gregor, 1981	Hospitalized patients with unstable angina or myocardial infarction. Experimental Ss: N=37. Control Ss: N=44. Random assignment.	Cardiac disease & factors in the therapeutic regimen. Activity & emotions.	Experimental treatment: programmed instruction booklet. Nurse present. 113.73 minutes mean time. 2.12 mean number of sessions. Control: hospital routine.	Different knowledge tests for pretest & posttests at discharge & 2 weeks. 50 closed questions on each test. Effort given to establishing reliability & validity of test & booklet.	Experimental Ss had significantly ($p < .001$) greater knowledge scores on posttests at discharge & 2 weeks later. Test forms required high reading ability.	Medication teaching & testing content not detailed, if given. As applied, learner allotted lower degree of control.

content was not described.

A medium degree of learner control is allotted the learner in decision-making and tailoring strategies. Learner participation is elicited in both methods of instruction by the teacher. These methods consider the learner's individual needs and utilize the teacher's knowledge and experience simultaneously in one strategy.

In the decision-making strategy described and studied by Hallburg (1969), the nurse and the patient together identify the teaching goal of a workable medication regimen. Alternatives and the associated consequences of various courses of action are considered mutually by the patient and nurse. An alternative is selected that has the greatest probability of attaining the goal of the patient adhering to a self-administered medication regimen. Working together increases the individual patient's commitment to implement the plan and attain the goal. Reinforcement of the patient's participation and workable alternatives are integral parts of the decision-making process. In Hallburg's (1969) study of outpatients with medical diagnoses, the experimental group who participated in the decision-making teaching strategy showed no significant differences in reported deviations, serious errors, or knowledge compared to a control group who received the routine medication teaching.

There were several limitations of the Hallburg (1969) study which decreased the ability to generalize the findings. As shown in Table 2, random assignment of subjects to the two groups was not done. The comparability of the two groups was not discussed. The subjects varied

in their medical diagnoses and the medications they were prescribed. The interviewer asked open-ended questions and wrote the subject's responses allowing for the possibility of error. Other systematic teaching strategies were not compared to the decision-making strategy.

Another instructional method allowing a medium degree of learner control is tailoring. Tailoring assists a patient in the development of a workable plan for incorporating a therapeutic regimen, e.g., medication-taking, into his daily schedule. This behavioral strategy is designed to increase medication compliance. The learner is allowed a medium degree of control in the process, timing and content of the instruction. The teacher also shares control in these instructional aspects. In a recent study by Norell (1979), the experimental group of glaucoma patients received a slide/tape program with a pamphlet and participated in a tailoring program. When the tailoring method was administered, a medium degree of learner control was allotted. However, a varying to low degree of learner control was allotted the learner with the administration of the slide/tape program and its subsequent discussion. These factors made it difficult to characterize the degree of control of the overall instructional method. Therefore, the medium to varying from a medium to low degree of learner control classification was made.

In the Norell (1979) study, the tailoring consisted of an interview with the patient assessing his daily habits to determine the most feasible times for administration of the pilocarpine medication. The times and routines of self-medication were written on the patient's information sheet which he received during the program. Knowledge and

understanding were checked and reviewed by an ophthamology assistant. Questions from patients were encouraged as were discussions regarding medication problems. In the experimental group, Norell found a significant decrease in missed medication doses and greater accuracy in the timing of the drug administrations. Norell did not assess whether learning had occurred by knowledge tests. By assessing the patients' changes in eye drop administration through the medication monitor, he was able to show that the education and tailoring program did have an effect on the desired outcome of correct medication administration at home. Although knowledge tests were not administered, knowledge increases were inferred by the significant increase in patient compliance behavior.

In reference to Table 2, a strength of Norell's (1979) study was that random assignment of adequate numbers of subjects to the groups was made. A limitation was that the degree of control allotted the experimental subject changed according to which instructional method was being administered at the time. The study demonstrated that systematically administered instruction positively alters medication-taking behaviors, especially when compared to persons not receiving instruction.

Most of the patient teaching studies reviewed in Table 2 implement strategies which allowed a varying degree of learner control. Frequently most of the instructional aspects were controlled by the teacher. However, in the descriptions of the strategies in the studies, the discussion interaction was emphasized. Therefore the degree of control

allotted the patient varied between various studies as well as within the studies.

A preponderance of studies used one-to-one lecture-discussion methods which allowed the learner a varying degree of control in instruction (Bille, 1977; Bracken, Bracken & Landry, 1977; Deberry, Jefferies & Light, 1975; Guzzetta, 1979; Hecht, 1974; Linde & Janz, 1979; Rahe, Scalzi & Shine, 1975; Sechrist, 1979; White, Lemon & Albanese, 1980). A health professional, frequently a nurse, informed the patient about pertinent content and answered patient's questions. Depending on the individual teacher's style preferences and the needs of the learner, this method allowed a low to medium range of learner control.

Several studies implementing one-to-one lecture-discussion methods with cardiac subjects demonstrated knowledge gains from pretest to posttest (Deberry, et al., 1975; Guzzetta, 1979; Linde & Janz, 1979; Rahe, et al., 1975). A weakness in these studies was the lack of comparison groups who had not received instruction. In the one study where a control group was used, no differences were found in knowledge gains between an experimentally taught group and a control group of cardiac patients (Bille, 1977). These results suggest that the cardiac patients in the former studies may have been sensitized by the pretests which affected the positive posttest knowledge results. However, in Bille's study the subjects were not randomly assigned to the two groups and there was not any determination made of the equivalency of the groups. The effects of group differences may have accounted for the results.

Two strategies which varied in the degree of learner control over the instructional aspects were compared in a cardiac study by Bracken, et al. (1977). A videotape series was implemented with one group and compared to a group who received a lecture series. One videotape program of the series was shown daily at four different times. This allowed the subject a choice over the time of the instruction and whether to view it more than once. The comparison strategy, the lecture series, did not allow the learner the selection of time or repetition. The latter strategy had a lower degree of learner control allotted. Knowledge results were not different between the two groups. The strategies may not have been very different in terms of the degree of learner control and as a result did not effect the knowledge scores differently. However, each of the subjects after receiving their specific treatment was also offered a one-to-one lecture-discussion by a nurse encompassing the same content. This additional instruction could have equalized the knowledge scores of the two groups.

Several additional factors limited the interpretation of the study by Bracken, et al., (1977). The subjects were not randomly assigned to the treatment groups and therefore the equivalency of the groups was not established. Significant attrition of subjects had occurred to both groups. The medication teaching and testing content was not described. Test sensitization could have occurred with the administration of the same test before and after instruction.

In Snow's (1980) conceptualization of the control continuum, programmed instruction strategies were toward the lower end of the

control continuum. Programmed instruction booklets were constructed for cardiac patient teaching in two studies (Gregor, 1981; Rankin, 1979).

As implemented the programmed instruction strategy in Rankin's (1979) study allotted the learner a low degree of control in the pacing and timing of the instructional materials. The comparison group received a pamphlet which allotted a similarly low degree of learner control. The group which received the programmed instruction strategy had significantly greater knowledge gains which continued to be present when the patients returned home. The results suggested that programmed instruction resulted in greater knowledge gains perhaps through a greater degree of learner involvement than the reading of a pamphlet.

Random assignment of the cardiac subjects to the groups was a strength of the Rankin (1979) study. Also attention was given to the reliability and validity of the knowledge tests and the programmed instruction materials. A limitation affecting the results of the study, however, is that the knowledge test may have been written from the programmed instruction's content and format and without the consideration of the pamphlet's content and format. This factor would have made it difficult for the subjects receiving the pamphlet to show knowledge gains.

In three additional cardiac studies implementing audiovisual strategies, the degree of learner control was low. The nurse or pharmacist controlled and administered the slide/lecture or slide/tape programs, respectively, to the patients in the studies by Milazzo (1980), Haggerty, Berardi, Young and Kimberlin (1978), and Soflin, Young and Clayton (1977). Patient participation was not encouraged until

perhaps after the administration of the particular program. In the studies by Milazzo and Soflin, et al., the experimental groups who received the slide/lecture or slide/tape series, respectively, had greater knowledge increases than the control groups which received the hospital routines. In the study by Haggerty, et al., four groups received one of two slide/tape programs with or without a pharmacist present and demonstrated no knowledge differences. Cardiac subjects taught by audiovisual programs allowing a low degree of learner control and with or without a health professional present showed increased knowledge gains when compared to subjects who did not have similar access to instructional content or methods.

The findings of these studies may have been affected by several factors. In all three studies (Haggerty, et al., 1978; Milazzo, 1980; Soflin, et al., 1977), the cardiac subjects were randomly assigned to each of the groups. A second experimental group who received only the posttests for knowledge was added in the design by Milazzo to control for pretest sensitization. In the studies by Soflin, et al., and Haggerty, et al., the digoxin medication teaching and testing content was described. The knowledge instrument in the study by Haggerty, et al., was revised from the original implemented in Soflin, et al., and underwent reliability and validity testing. A limiting factor in all the studies was the small group sizes. In Milazzo's study the specific medication content taught and tested was not described. The knowledge instruments in Milazzo's and Soflin's, et al., studies did not have reliability and validity reports. Though all the groups in the study by

Haggerty, et al., had similar access to an instructional method, the researchers compared instructional strategies which were the same in terms of the degree of control allotted the learners.

In the review of the patient teaching studies shown in Table 2, the degree of control allotted the learner was not specifically addressed by the researchers. As described in the patient education research reports, the degree of control allotted the learners appears to have ranged from a high degree to lower degrees. Most of the studies implemented strategies which allotted varying to lower degrees of learner control. The findings from the studies often demonstrated knowledge gains regardless of the degree of control allotted the learner. When teaching strategies were compared in a study, the strategies commonly did not differ in the degree of learner control allowed in the instructional methods. The interpretation of the findings of the patient education studies was additionally confounded by several instructional issues which are discussed in the following section.

Selected Instructional Issues

Several issues were apparent from the literature cited in Table 2 which confounded the clear interpretation of the findings of the patient education studies. These confounding issues involved: (1) the degree of accuracy of the knowledge tests, (2) the varying lengths of the instructional period, (3) the effects of combination teaching methods, (4) the adjunctive use of written materials, (5) the repetition of instruction, and (6) the scheduling of instruction.

Knowledge test instruments. It is important to evaluate patient instruction to determine if teaching has been effective in the communication of medication information. Knowledge tests were used frequently in many cardiac studies in Table 2 to determine knowledge gains (Barbarowicz, et al., 1980; Bille, 1977; Bracken, et al., 1977; Deberry, et al., 1975; Gregor, 1981; Guzzetta, 1979; Haggerty, et al., 1978; Linde & Janz, 1979; Milazzo, 1980; Rahe, et al., 1975; Rankin, 1979; Soflin, et al., 1977; White, et al., 1980). However, several prcblems were apparent with the knowledge test instruments in these studies. The knowledge test gains may have resulted from pretest sensitization in a number of studies (Barbarowicz, et al., 1980; Deberry, et al., 1975; Gregor, 1981; Guzzetta, 1979; Linde & Janz, 1979; Rahe, et al., 1975; Soflin, et al., 1977). In the majority of cardiac studies, test recall may have affected the results through the use of the identical test items at each test administration (Barbarowicz, et al., 1980; Deberry, et al., 1975; Guzzetta, 1979; Linde & Janz, 1979; Milazzo, 1980; Rahe, et al., 1975; Rankin, 1979; Soflin, et al., 1977). Open-ended questions in two studies allowed for the possibility of bias in the scoring of the tests (Deberry, et al., 1975; Linde & Janz, 1979). Frequently efforts at establishing the reliability and validity of the knowledge instruments were not reported (Barbarowicz, et al., 1980; Bracken, et al., 1977; Deberry, et al., 1975; Linde & Janz, 1979; Milazzo, 1980; Rahe, et al., 1975; Soflin, et al., 1977; White, et al., 1980). In studies which taught several facets of the cardiac therapeutic regimen, a limited number of items tested medication

information (Linde & Janz, 1979; Rahe, et al., 1975; White, et al., 1980). Several cardiac studies reported knowledge retention at home which may have resulted in part from the problems discussed above (Barbarowicz, et al., 1980; Gregor, 1981; Linde & Janz, 1979; Rankin, 1979).

Length of the instructional period. Different strategies take varying amounts of time to implement. The length of an instructional session varied among the patient education studies which reported time and ranged from a six minute slide/tape program (Haggerty, et al., 1978) to a one hour individual lecture-discussion (Guzzetta, 1979). Often the length of time reported did not include the total time spent with the instructional content. From the studies, there was no clear indication of the optimal amount of time to allow for a specific instructional method in order to achieve optimal learning outcomes. Generally, most patient education studies in Table 2 reported individual sessions of less than or equal to one hour. Further studies need to compare different teaching strategies to determine the most effective method with the greatest knowledge gains after a specific amount of instructional time.

Combination teaching methods. As reviewed in Table 2, two studies implemented more than one teaching method in the instruction which made it difficult to determine the effect of one method on the learning outcomes (Bracken, et al., 1977; Norell, 1979). The reported learning outcomes had to be attributed to the particular combination of instructional methods which were implemented. Therefore the determination of the effectiveness of one instructional method compared

to another was not possible.

Written materials. Frequently patient education studies reported in Table 2 used written materials as adjunctive teaching devices (Barbarowicz, et al., 1980; Bille, 1977; Deberry, et al., 1975; Guzzetta, 1979; Hecht, 1974; Linde & Janz, 1979; Norell, 1979; Rahe, et al., 1975; White, et al., 1980). Because written materials were read at the patient's inclination, it was difficult to determine the frequency of their use, the time involved in reading them, whether they were read repeatedly, and their isolated effect apart from other teaching methods on the learning outcomes.

Repetitive instruction. Repetition of information can result in increased knowledge as demonstrated in a teaching study by Sechrist (1979) of student nurses who taught patients about a prescribed antibiotic. Those patients taught in two repeated sessions showed that they had learned significantly more ($p < .01$) than those patients who received one teaching session. In the studies by Deberry, et al., (1975) and Hecht (1974) identical instructional sessions were repeated to selected subjects and knowledge gains were reported. In studies which combined instructional methods and/or materials, the repetition of the informational content through the additional, but different, teaching method or material contributed to the positive knowledge outcomes (Barbarowicz, et al., 1980; Guzzetta, 1979; Linde & Janz, 1979; Norell, 1979; Rahe, et al., 1975).

Schedule for teaching. Another factor necessary for consideration in teaching is at what point during hospitalization teaching should

begin for the greatest assimilation of knowledge. The scheduling of teaching is important to consider for teaching to be effective to take advantage of physical and psychological readiness of the cardiac patient. Knowledge increased in the majority of the cardiac studies which taught during hospitalization but after transfer from the intensive care unit (Barbarowicz, et al., 1980; Deberry, et al., 1975; Gregor, 1981; Guzzetta, 1979; Linde & Janz, 1979; Milazzo, 1980; Rahe, et al., 1975; Rankin, 1979; Soflin, et al., 1977). Of particular interest in the study by Guzzetta (1979) was the finding that patients with a lower level of anxiety at the initiation of teaching were found to have greater knowledge gains. When hospitalized patients are anticipating discharge, they are concerned with how they will manage at home. Teaching the cardiac patient about their medications prior to discharge home allows the patient to acquire knowledge that can be used immediately upon return home.

Learner Characteristics: Health Locus of Control

Characteristics of the learner have known effects on learning outcomes and are amply documented in the educational literature (Cronbach & Snow, 1977). For purposes of this review, the discussion of learner characteristics will be limited to the learner's health locus of control orientation.

The construct of locus of control was developed from social learning theory by Rotter (1966). It is defined as a person's beliefs about the relationship of his behavior and its outcomes. The chosen behavior is expected to lead to a particular reinforcement.

Reinforcement is either believed to be under the control of the individual (internal) or outside forces such as chance, fate and powerful others (external). Knowledge of an individual's locus of control orientation can contribute to the prediction of health behavior.

In reviews by Arakelian (1980), Strickland (1978), and Wallston and Wallston (1978), internally-oriented persons were more likely to seek information about their disease, take medication, make and keep physician appointments, maintain a diet and cease smoking. However, one study of diabetic patients contradicted these positive behaviors suggesting that it may be more functional to hold external beliefs (Lowery & DuCette, 1976). Other complex factors may be influencing a person's health behavior that have yet to be documented (Arakelian, 1980; Strickland, 1978; Wallston & Wallston, 1978). In the present study the beliefs the cardiac patient holds in relation to health locus of control were systematically controlled across the teaching strategies.

In summary, the literature review reveals a lack of patient education research which compares educational strategies that are based on a common conceptualization. Only a few studies of cardiac patients compared planned, defined teaching strategies to determine which was the most effective. Rarely did studies concentrate on the cardiac medication regimen alone. Identical knowledge tests were frequently administered before and after teaching. The learner characteristics were not systematically evaluated or controlled for their effects on the learning outcomes. In addition, most strategies implemented in the

cardiac studies did not actively elicit patient participation in the instructional process thus failing to incorporate learning principles addressed to the adult learner. The present study attempted to correct for these identified methodological weaknesses in the designing and testing of the patient teaching strategies.

Purpose of the Study

The purpose of the present study was to determine the most effective method to teach self-administered prescribed medications to hospitalized chronically-ill persons with cardiac conditions in terms of knowledge acquisition and retention. The following hypotheses were formulated:

I. There will be a significant increase in knowledge acquisition among the three patient-teaching groups compared to the no teaching control group.

II. Persons in the decision-making group will show a significant increase in knowledge acquisition over the other two patient-teaching groups.

III. There will be a significant increase in knowledge retention among the three patient-teaching groups compared to the no teaching control group.

IV. The decision-making group will show a significant increase in knowledge retention over the other two patient-teaching groups.

CHAPTER II

METHODS

This study is part of a larger federally-funded consortium study titled "Patient-Teaching Trait-Treatment Interaction" in which May Rawlinson, Ph.D., was the Principal Investigator. The data in the present study were collected from August, 1979 to November, 1980.

Subjects and Setting

The subjects included in the present study were 32 inpatients with cardiac illness who were chosen from three hospital sites. Problem lists in the patients' charts and medication lists were used to identify potential candidates on general medicine and cardiac units. The criteria for subject selection included those cardiac patients who:

1) were at least 18 years of age or older.
2) spoke and read English as their primary language.
3) were in the non-acute stage of their illness with discharge anticipated within four days.
4) were potentially capable of self-care in managing medications.
5) lived within a fifty-mile radius of the health care facility.
6) were taking at least two of the three study drugs: digoxin, diuretics, and potassium replacement.
7) scored at or below the following cut-off points on the knowledge

pretest: cardiac = 14; diuretics = 10; and replacement = 10. The diagnoses of the subjects included congestive heart failure, myocardial infarction, coronary artery bypass graft surgery, and/or valve replacement surgery.

Three hospitals in the Portland metropolitan area were used. They were (1) a Veterans' Administration hospital which had a 543 bed capacity with 64 beds designated for cardiac care, (2) a university teaching hospital with 487 beds of which 24 beds were designated for cardiac care, and (3) a non-profit community hospital with a 451 bed capacity of which ten beds were designated for specialized cardiac care. Informed consent was obtained from both the patient and his/her physician (See Appendix A).

Independent Variable: Medication Teaching Treatments

The independent variable of this study, the type of medication-taking teaching intervention, was ordered along a continuum of the degree of control afforded the subjects over the content and process of learning as described by Snow (1980). Three teaching treatments (Strategies 1, 2, and 3) were compared with a control treatment (Strategy 4) which was the hospital's routine instruction. In each of the three teaching strategies, the same content was available to the subjects since the teaching material was based on the same instructional objectives. The routine hospital teaching was also available to the teaching groups. The subjects had different degrees of control over the

content and the process of learning which are specified in the following sections.

Strategy 1 was the traditional lecture method. The subject had a low degree of control over the content and process of teaching. The teacher gave the content from a script in a lecture format to the subject without encouraging interruptions. The goals, the sequencing of the material and the pacing of the instruction were all controlled by the teacher. The subject's questions were answered at the end of each session by the teacher. The teaching took place in two sessions of about thirty minutes each. The teacher recorded the actual time of the teaching interaction (See Appendix B for scripts of lectures).

Strategy 2, the "decision-making approach", enlisted the subject's active participation. This teaching approach was developed and tested by Hallburg (1969). Hallburg defined decision-making as a process in which a plan of action evolves to fulfill and meet a goal. The process involves goal-setting, comparing various ways to reach the goal and the actual possible outcomes, and choosing the way to achieve the goal which is most likely to be accomplished in the desired manner.

The interactive nature of teaching was emphasized in the decision-making method. The subject's abilities and needs in safe home medication management were determined mutually by the teacher and the subject. The subject and the teacher anticipated potential problems with the home medication regimen and then worked on solutions together. The teacher consciously elicited and dealt with the subject's concerns regarding home medication management. The subject's resources for

establishing a regimen, which was tailored specifically to his daily routine, were assessed and supplemented by the teacher. The subject was encouraged to verbalize his thoughts and received feedback in support of his beliefs and/or correct alternatives to include in his plan for safe home medication taking.

The subject's participation in planning for safe home medication management was reinforced by the teacher. The subject had a medium degree of control over both the content and process of teaching. The subject and teacher together controlled what was discussed, how the information was sequenced and the pacing of the instruction. The teaching occurred in two sessions at the bedside and the amount of time was recorded after each session by the teacher. Checklists were completed by the teacher following each session to ensure that all pertinent content was addressed in the administration of this strategy (See Appendix C for sample of checklist).

The subject in Strategy 3 was allowed maximum control over both the content and process of teaching. This was a self-directed approach employing audiovisual materials which the subject reviewed independently. A cart, which was left at the subject's bedside for 48 hours, contained the following: a slide-sound presentation containing information relating to two prescribed drugs and the principles of safe medication administration, drug information pamphlets, two flip charts (heart function and medications), drug samples, and a sample medication recording form (See Appendix D for description of the materials). The subject determined which materials, if any, to review, the order in which he wished to review them, and the amount of time to spend on any

part of the content. Therefore, the subject controlled the selection, pacing, sequencing, and timing of the instructional materials. The teacher's role was to facilitate learning by assisting the subject to use the self-instructional materials. The equipment was explained to the subjects and their questions were answered. The teacher was available by phone to assist in case of equipment malfunction during the 48 hours in which the teaching materials were left at the bedside. Also the teacher visited the subject briefly once each day to insure that the materials were available and that the equipment was working properly. A recording sheet to document the time spent on each of the learning materials was filled out by the subject (See Appendix E for sample of recording sheet).

The control group, designated as Strategy 4, received no systematic teaching in this study. This group controlled for the effects of testing and the effects of routine care including any informal teaching occurring in the particular institution. None of the hospitals used in this study had a systematic patient-teaching program in operation.

The content of the teaching in the three teaching strategies was standardized so that the same information was available to each of the subjects. The content for the teaching of safe medication practices was developed from eleven instructional objectives. Six instructional objectives were used in the development of content specific to each of the three types of drugs prescribed for cardiac patients: digoxin, diuretics, and potassium replacement. The emphasis of the teaching was

to help the subject know more about his medications and to take them safely at home (See Appendix F for a list of teaching objectives).

Data Collection Instruments

Attribute Variables

The following instruments were used to measure selected attributes of the subjects. These variables were identified in order to control for their effects on the outcome measures of the study. They were included to assess their distribution across the teaching groups and to validate that they did not systematically bias the effects of the study.

Hospital Interview Schedule. Demographic and descriptive information on each subject was collected using the Hospital Interview Schedule (See Appendix G) and included the subject's age, sex, marital status, educational background, income, employment, ethnic group, and source of payment for medications. The length of illness in years and length of hospitalization were also obtained. The subject was rated on socioeconomic status using the Duncan-Reiss Socioeconomic Index (Reiss, 1961).

Memory Retention Scales. Two subscales from the Wechsler Memory Scale (Wechsler, 1945) were administered to each subject to determine if the subject had the ability to follow instructions and attend to a learning task. These scales are among the most commonly used standardized scales to test memory (Wechsler, 1945).

The Digit Span Memory Test (See Appendix H) consists of two lists of numbers to be repeated. The first list is of a series of numbers to

be repeated forwards varying from three digits to nine digits. The second list contains a series of numbers ranging from two to eight which are repeated backwards. The score is the number of digits in the longest series repeated without error in two possible trials in both the forward and backward conditions. The total score can range from 0 to 17 points.

The Associate Learning Test (See Appendix I) consists of three lists, each containing ten pairs of words. Six pairs of words are associated easily (i.e., north-south). Four pairs are more difficult to associate (i.e., obey-inch). The score was calculated from the three list presentations of 10 items each. Easier items received 0.5 point, and more difficult items 1.0 point. The total score may vary from 0 to 21.

In a study by Cauthen (1977) of the memory function of persons 60 years of age and older, there was found to be no significant decreases on digit span memory with increasing age. The test of associate learning memory is concerned with the person's ability to form new associations. Analysis of the more difficult items on the associate learning memory scale demonstrated that the older aged persons had more difficulty than Wechsler's (1945) 40 to 49 age group but not significantly.

Multidimensional Health Locus of Control (MHLC) Scales. The MHLC scales (Wallston, Wallston, & DeVellis, 1978) were developed specifically for health situations. The internal dimension of the scales tests for the individual's belief that his health is under his own control and is a result of his own behavior. The external dimension of locus of control is differentiated into two areas: the belief that

health is a result of chance or fate and the belief that health is influenced by powerful others such as family members or professional persons.

A recent study by Hartke and Kunce (1982) studied the multidimensional health locus of control of hospitalized veterans with half the subjects having hypertension and the remaining half having various diagnosed medical disorders. A majority of these patients believed in their ability to control their own health. However, they simultaneously held the belief that their health was under the control of powerful others. This may be the result of having frequent physician visits for treatment of hypertension and/or other medical problems. The patients did not believe that the control of their health was the result of fate. This is in contrast to the study by Wallston, et al., (1978) which found that healthy persons believed that their health was determined by themselves. Healthy subjects did not believe their health was controlled by powerful others or a result of fate.

The MHLC scales (See Appendix J) are comprised of 18 items developed to determine the belief that the source of reinforcements for health-related behaviors are primarily internal (6 items), a matter of chance (6 items), or under the control of powerful others (6 items). Al items use a 6 point, Likert-type format ranging from "strongly disagree" (scored as 1) to "strongly agree" (scored as 6). Points are summed for each of the three subscales. Scores range from 6 to 36 on each subscale. High scores indicate the presence with the particular

locus of control construct.

Internal consistency of the MHLC scales was measured by alpha reliabilities and ranged from 0.67 to 0.76. These compared favorably to the Internal, Powerful Others and Chance scales of Levenson which ranged from 0.51 to 0.73 (Wallston, et al., 1978). The intercorrelation of the MHLC scales with the appropriate Internal, Powerful Others and Chance scales by Levenson (1974) demonstrated positive correlations. However, only the Chance Health Locus of Control and Powerful Others Health Locus of Control were significantly positively correlated (Wallston, et al., 1978). Wallston, et al., (1978) recommend that further studies be conducted on the reliability and validity of the MHLC scales.

Dependent Variable Measures: Knowledge Tests

The knowledge tests were developed following a procedure called "Steps in the Development of a Criterion-Referenced Test for Research on Teaching" by Haladyna (1979). These steps were completed in the following sequence:

1) specification of the content domain in terms of measurable objectives (See Appendix F for objectives)
2) development of appropriate test items
3) logical review of test items by content specialists (pharmacist, master's-prepared nurses, clinical specialists, nurse researchers)
4) construction of three comparable forms of each test
5) developmental testing (pilot)

6) empirical review of persons who resemble the patient population

7) reliability testing and item analysis

The knowledge tests were criterion-referenced. Test items were developed for each objective and thus measured the subject's understanding in relation to each objective. Multiple choice test items were generated from the objectives by a team of nurse researchers, nurse clinical specialists, a pharmacist, and a measurement specialist. Each test item was checked for item-objective congruence to insure that test items included the domain of knowledge for which the test was intended. Three similar test forms for safety and each of the three medications--cardiac, replacement, and diuretic--were generated from the items. Field tests of the test forms were conducted with three cardiac patients, one from each hospital. Field tests were also conducted with college students in basic science courses who were asked to complete all three test forms so scores on each test could be compared. From the results of the field tests, revisions were made to certain items requiring further clarification.

There were three alternate forms of the knowledge tests for each of the three medications and for safety. See Appendices K, L, M, and N for an example of each form. The number of items in each of the three test forms were: 11 for medication safety knowledge; 20 for cardiac medication knowledge; 15 for replacement medication knowledge; and 15 for diuretic medication knowledge. Each test item contained a choice among five options.

Three kinds of reliability studies were conducted: 1) internal

consistency using the KR-20 estimate of reliability; 2) equivalence by correlation; and 3) equivalence by a group-differences method (Haladyna, 1979). On all forms of the knowledge tests--safety, cardiac, replacement, and diuretic--the reliability tests to determine equivalence by correlation for differences among the means and differences between pairs of variances proved non-significant. Reliability estimates for internal consistency and equivalence by a group-differences method follow for the knowledge tests.

The safety knowledge tests (See Appendix K) were not utilized as a measure of a subject's change in safety knowledge. These tests were deleted because in the developmental tryouts (pilot testing), the KR-20 reliability estimates ranged from .34 to .53 and the equivalence coefficients from .18 to .43, showing them to be unreliable. These low coefficients may have resulted from the fact that they were too easy for those tested.

Each of the cardiac medication knowledge test forms (See Appendix L) proved to be the most dependable measures. The KR-20 reliability estimates ranged from .92 to .93. The equivalence coefficients between pairs of test forms ranged from .89 to .92. These are both in the high ranges.

Reliability estimates by the KR-20 ranged from .84 to .88 and the equivalence coefficients between pairs of replacement medication knowledge test forms (See Appendix M) ranged from .71 to .86. These findings are in the higher range.

Reliability estimates by the KR-20 ranged from .67 to .75, a

moderate range, on the three test forms on diuretic knowledge (See Appendix N). Equivalence coefficients between pairs of test forms ranged from .72 to .74, also in the moderate range.

Procedure and Design

In the present study, nurses with at least a baccalaureate education participated as teachers and testers. Separate manuals for the teachers and for the testers were prepared to insure that the procedures were carried out as designed. The teachers and testers were trained in their particular tasks. The teachers viewed video tapes of Strategies 1 and 2 of the particular nurse-patient interactions. The manual described the administration of Strategy 3. The testers reviewed the particular tests in order to adhere to a similar method of administration. The testers were unaware as to the strategy implemented with the particular subject.

The subjects were selected through the review of charts and discussions with the charge nurse(s) and physicians. Consent forms were signed by both physician and patient. The knowledge pretests and the memory scales were administered and were used to determine eligibility for the study. The MHLC scales and hospital interview guide were administered. Test scores were not communicated to the teacher. Table 3 presents the sequence of the procedure for the study.

Subjects were randomly assigned according to a prepared randomized schedule to one of the four teaching treatments. Teaching was conducted over the next two days. After teaching was completed, a Teacher's Data Sheet (See Appendix O), a form devised to record the time of the inter-

Table 3

Procedure of the Study

Procedures	Inhospital days prior to discharge 4	3	2	1	Fourteen days after discharge
1) Selection of Subjects					
a. Review of charts	X				
b. Conference with charge nurse and/or physician regarding discharge	X				
c. Select patients Selection criteria list-- "Guide for Patient Selection" Diagnostic criteria--Cardiac	X				
d. Review above data for inclusion of subject	X				
e. Consent form signed by patient	X				
f. Consent form signed by physician	X				
2) Collection of Data on Traits (part of larger study)					
Administer tests for Locus of Control, etc.	X				
Fill out Hospital Interview Guide	X				
3) Assign Subject to Teaching Treatment					
Randomly assign according to designated plan	X				
4) Administration of Teaching Treatment					
Application of one of three teaching strategies or control group		X	X		
5) Collection of Data on Acquisition of Knowledge					
Administer knowledge posttest one				X	
6) Collection of Data on Retention of Knowledge					
Administer knowledge posttest two					X

action and document various information, was filled out on each subject. Posttest 1 was administered and arrangements were made for a home visit. On the particular date of the home visit, the medication knowledge posttest 2 was administered.

An experimental pretest-posttest control group design was implemented. For the purposes of this study, data collection to the control group stopped after obtaining the eighth control subject. The eight control subjects were matched with eight subjects from each of the three teaching treatments. It was determined that the difficulty of the drug content had the potential to exert a differential effect on the outcomes of the study. Matching within each hospital group was based primarily on the variable of drug difficulty, i.e. if a control Veterans Administration subject was tested on digoxin, then the Veterans Administration subject in each of the three strategies was selected who was taught and tested on digoxin. Diuretic medication was given the next consideration for the matching of subjects. Finally, memory scale scores and the length of illness of the subjects at a particular hospital were assessed for a comparable representation across the strategies.

From a Veterans Administration hospital, two control subjects were closely matched with two subjects (out of 6) from Strategy 1, two (out of 5) from Strategy 2 and two (out of 5) from Strategy 3. From a university teaching hospital, three control subjects were matched with three subjects (out of 5) from Strategy 1, three (out of 5) from Strategy 2 and three (out of 6) from Strategy 3. From a non-profit

community hospital, three control subjects were matched with three subjects (out of 3) from Strategy 1, three (out of 5) from Strategy 2, and three (out of 3) from Strategy 3. The total number of cardiac subjects studied was 32 out of 51 who completed the data requirements of the overall study.

Data Analysis

Knowledge acquisition was measured by the difference between the subject's score on the first posttest and his pretest score using analysis of covariance. Knowledge retention was measured by the difference between the subject's score on the second posttest and his pretest score using analysis of covariance. The covariate was the pretest score. Analysis of variance was used to determine the comparability of the groups on the variables of age, years of education, socioeconomic status, length of hospitalization, length of illness, Digit Span, Associate Learning, Internal Health Locus of Control, Powerful Others Health Locus of Control, and Chance Health Locus of Control. Chi-squares were used to determine comparability among the groups on sex, marital status, and employment status. The median income in each group was assessed by inspection.

CHAPTER III

RESULTS AND DISCUSSION

The results and discussion of this study are presented in the following sections. First, the total sample and the treatment groups are described by selected demographic, illness and personality characteristics. Next, the hypotheses concerning the knowledge outcomes among the four groups are addressed.

Description of Sample

This section describes the cardiac sample by demographic characteristics and by selected illness and personality characteristics. A summary of demographic characteristics of the total sample (N=32) and of the three teaching groups and the no teaching control group are presented in Table 4.

Demographic Characteristics

The mean age (63.16 years) of the total sample was indicative of persons near the age of retirement. This sample compared similarly to the sample of cardiac subjects in the study by Rankin (1979) which had a mean age of 63 years.

The sample was predominantly male which is similar to the sex distribution found in many of the studies of cardiac patients in the literature (Barbarowicz, Nelson, DeBusk, and Haskell, 1980; Bracken, Bracken, & Landry, 1977; Deberry, Jefferies, & Light, 1975; Gregor,

Table 4

Descriptive Characteristics of Total Cardiac Sample and Four Teaching Groups

	Combined N = 32	Group 1 N = 8	Group 2 N = 8	Group 3 N = 8	Group 4 N = 8	Significance of Difference
Age[a]						
Mean	63.16	59.25	62.38	63.25	67.75	F = 1.25
S. D.	9.0	10.43	6.52	7.38	10.50	
Sex[b,c]						
Male	20	5	4	4	7	χ^2 = 4.44*
Female	12	3	4	4	1	
Marital Status[b,c]						
Married	22	6	4	7	5	χ^2 = 0
Not Married	10	2	4	1	3	
Education in Years[a]						
Mean	11.94	14.38	10.13	13	10.25	F = 7.03*
S. D.	2.82	2.33	2.42	2.27	1.91	
Socioeconomic Status[a,d]						
Mean	31.46	35.17	26.33	31.2	33.13	F = 0.33
S. D.	17.93	23.53	16.01	10.19	21.47	
Employment Status[b,c]						
Employed	8	2	3	2	1	χ^2 = 0.53
Not Employed	20	4	4	5	7	
Missing	4	2	1	1	0	
Median Income	$9713.79	$11000	$5500	$10000	$8000	

[a]ANOVA conducted on age, education, and socioeconomic status.
[b]Data presented are frequencies.
[c]Chi-square conducted on sex, marital status, and employment status.
[d]Duncan's Socio-Economic Status Index (In Reiss, Duncan, Hall & North, 1961)
*$p < .05$

1981; Linde & Janz, 1979; Rahe, Scalzi, & Shine, 1975).

Two-thirds of the subjects in this sample were married. This compared similarly with the samples of cardiac patients in the literature (Bracken, et al., 1977; Guzzetta, 1979; Rahe, et al., 1975).

The subjects had a mean of 11.94 years of education suggesting general completion of a high school education. This sample was in the middle of the educational range with other similar subjects reported in the literature which ranged from 7.76 mean years in the group studied by Deberry, et al. (1975), to 14.4 years of education reported by Barbarowicz, et al. (1980).

The present sample obtained a mean score on Duncan's Socio-Economic Status Index (In Reiss, 1961) of 31.46 based on a 100 point scale. This scale is a composite of income and education data. The score obtained is in the low range indicating those in skilled and unskilled occupations with a lower SES rating. This is consistent with the older age and the nonworking majority of the group. When compared with other samples reported in the literature this cardiac sample ranks lower on social class. Barbarowicz, et al., (1980) reported the mean of their sample to be in the middle-middle social class. Bracken, et al., (1977) reported that 72% of their subjects described themselves as technicians, clerical workers, sales workers, semi-professionals, business owners or managers and professionals. The various scales used in these studies make it difficult to compare the groups accurately; however, the present sample had a consistently lower socioeconomic class rating than the other studies of cardiac samples in the patient teaching literature.

The current employment status of the total group showed a majority not working (71% of 28 reporting). This finding is consistent with the older age of the sample with many subjects retired and not working. This contrasted with three teaching studies with cardiac samples which reported on this characteristic. In the Barbarowicz, et al., (1980), Bracken, et al., (1977), and Guzzetta (1979) studies, they reported 63 to 64% current employment among their samples of patients. This suggests that younger and middle class samples with heart conditions are more likely to continue work compared to an older and lower class sample.

The median annual income of the total sample of the present study was $9713.79. This was much lower than the median income of the general population for 1977 according to the U.S. Census Bureau. For instance, the median income for families headed by persons 45 to 54 years of age was $23,927; for persons 55 to 64 years of age, $20,918; and those 65 years and older, $12,889 (U.S. Bureau of Census, 1978).

In summary, this sample was predominantly older, married males who had a high school education. Most of the sample was not working. The average SES rating and family income were lower than in the general U.S. population.

Selected Illness and Personality Characteristics

A summary of the illness and personality characteristics of the total sample (N = 32) and of the four treatment groups is presented in Table 5. The average length of cardiac illness was 8.44 years for this sample which contrasted sharply to the mean length of illness of 3.33

Table 5

Selected Illness and Personality Characteristics of Cardiac Subjects

	Combined N = 32	Group 1 N = 8	Group 2 N = 8	Group 3 N = 8	Group 4 N = 8	Significance of Difference
Duration of Illness						
Length of Illness (years)						
Mean	8.44	7.63	7.13	9.5	9.5	F = 0.206
S. D.	7.43	8.31	4.94	10.43	6.07	
Length of Hospital-ization (days)						
Mean	7.56	7.25	6.88	7.25	8.88	F = 0.52
S. D.	3.43	3.99	3.91	2.82	3.18	
Memory Scales						
Digit Span						
Mean	10.44	10.63	9.25	10.88	11	F = 1.28
S. D.	2.05	1.85	1.49	2.8	1.69	
Associate Learning						
Mean	11.52	11.56	12.13	12.56	9.81	F = 1.57
S. D.	2.8	1.79	4.14	1.55	2.65	
MHLC						
IHLC						
Mean	24.31	26	23.38	22.13	25.75	F = 1.15
S. D.	4.99	5.01	4.84	5.62	4.23	
PHLC						
Mean	25.125	25.5	22.875	24.75	27.375	F = 1.21
S. D.	4.84	3.16	7.16	3.85	4.00	
CHLC						
Mean	17.00	14.63	21.13	14.38	17.88	F = 2.73
S. D.	5.88	2.97	7.86	4.57	5.19	

$p < .05$
ANOVA

years for patients who were younger and employed in the study by Barbarowicz, et al., (1980). Other investigators did not report on the length of illness of their samples.

The average length of hospitalization for the present sample prior to teaching was seven days. The two studies in the literature which reported on this factor are consistent with the present sample; Barbarowicz, et al., (1980) reported 7.7 days and White, Lemon, & Albanese (1980) reported 10 days.

The present sample achieved a mean score of 10.44 on the Digit Span Memory Scale. This score indicates that the sample had average cognitive function in the ability to be attentive and to concentrate. Healthy subjects who were 40 to 49 years of age and institutionalized subjects who were 60 to 69 years of age had mean scores similar to the present sample and were reported by Wechsler (1945) and Cauthen (1977), respectively.

A mean score of 11.52 was obtained by the present sample on the Associate Learning Scale. This scale measures the subject's ability to form new associations among concepts in addition to the ability to recall and concentrate on learning tasks. On this characteristic the score of the present sample was similar to the score of 12.8 that Cauthen (1977) reported in his 60 to 69 year old subjects.

The subjects' beliefs in the control of their health were measured by the Multidimensional Health Locus of Control Scale (Wallston, Wallston, & DeVellis, 1978). It was of interest to compare the mean scores for subjects in the present sample with those of subjects studied

by Hartke and Kunce (1982) and Wallston, et al., (1978). The mean scores for the three scales of Internal, Powerful Others, and Chance Health Locus of Control were 24.31, 25.13, and 17, respectively, for the subjects with cardiac disease in the present study. These scores compare similarly with the mean scores of 25.5, 23.8, and 17.8, respectively, reported by Hartke and Kunce (1982) for male medical patients in a Veterans Administration medical center with a mean age of 58 years and an average educational level of 10 years. The subjects in the present study and in the study by Hartke and Kunce indicated greater belief in external forces, especially powerful others, controlling their health as compared to healthy subjects studied by Wallston, et al., (1978). In this latter study by Wallston, et al., the subjects' MHLC scores for Internal, Powerful Others, and Chance were 25.10, 19.99, and 15.57, respectively. The subjects were healthy, averaged 42 years of age and had some college education in the study by Wallston, et al., (1978). The cardiac and medical subjects who were also older and less educated believed their health to be influenced more by powerful others, e.g. medical professionals. It appears that age, education and medical illness may affect beliefs in health locus of control.

In summary, the mean length of cardiac illness among the present subjects was longer though their stay in the hospital was of average length when compared to other samples reported in the literature. They demonstrated a normal ability to concentrate, to remember and to make new associations between concepts. Like other medical patients, the cardiac subjects showed similar beliefs in internal, powerful others and chance on the health locus of control dimensions.

Descriptive Characteristics among the Treatment Groups

Data were analyzed to determine the comparability of subjects across the teaching groups as a result of their being randomly-assigned to groups and matched on selected characteristics. This section examines the descriptive characteristics of the four treatment groups and discusses their comparability on these variables. Illness-related and personality factors will be examined for their comparability across teaching groups in the next section.

There were no significant differences by ANOVA found among the four groups in age. However, as shown in Table 4, the sex distribution among the groups proved to be significantly different. Chi-square analysis on sex distribution showed a significant difference between the first three groups and the fourth group. The sex distribution of all the groups corresponded with the literature which reported a predominance of male subjects having cardiac disease. A chi-square analysis was performed on the distribution of marital status between the combined subjects in groups 1, 2, and 3 compared with group 4 and showed no significant differences. Therefore, group 4, the control group, was similar to the total of the other groups on the distribution of marital status.

The number of years of education among the four groups was significantly different based on the ANOVA ($F = 7.03$) as seen in Table 4. Further analyses by *a posteriori* tests (Kirk, 1968) showed that significant differences were obtained between groups 1 and 2 ($p < .01$) and between groups 1 and 4 ($p < .01$). Group 1 had significantly greater

mean years of education than either group 2 or 4 but was similar to group 3 in mean years of education.

As shown in Table 4, no significant differences among the groups were found on socioeconomic status by ANOVA. Within each treatment group most subjects reported they were not working. Chi-square was used to determine the comparability of the four treatment groups. No significant differences among the treatment groups were found in the distributions of subjects who were working and those who were not. Therefore, group 4 compared similarly to groups 1, 2, and 3 on employment status and in socioeconomic status. By inspection of the median incomes for each group in Table 4, it may be seen that group 2 had the lowest median income of all four groups. The other groups 1, 3, and 4 had median incomes more closely alike.

In summary, the four groups were found to be similar in age and socioeconomic status. The marital and employment status of group 4 (control) was not different from the three teaching groups combined. However, the proportion of males in group 4 was significantly different than the proportion of males in the other three teaching groups. The years of education in group 1 were much greater than in groups 2 or 4. Group 2 had the lowest median income among the groups. Therefore, no one group consistently varied on these descriptive characteristics suggesting that the differences which were found did not offer a special advantage to one group over another in a systematic manner.

Illness and Personality Characteristics among the Treatment Groups

The illness and personality traits of persons in the groups are described in this section (see Table 5). All four groups were similar in duration of cardiac illness and length of hospitalization based on ANOVA. The groups were also found to be alike on the Digit Span and Associate Learning Memory Scales (Wechsler, 1945) by ANOVA. Therefore, each group was similar in the subjects' abilities to concentrate, to remember, and to form new associations between concepts.

No significant differences by ANOVA were found in any of the three dimensions of health locus of control among the treatment groups. Therefore, the treatment groups demonstrated similar beliefs in health locus of control in the internal and external dimensions.

In summation, the groups were similar in their length of illness and hospital stay. The ability to concentrate, to remember and to form new associations between concepts was found to be alike among the four groups. The groups were found to be comparable in their belief that health was the result of internal control as well as simultaneously believing their health was influenced by powerful others. The belief in control of health by fate or chance was comparable among the groups as well.

Evidence For and Against the Hypotheses

In this section, data are presented and discussed in relation to each of the the four hypotheses which concerned the knowledge outcomes from different instructional strategies administered to cardiac

subjects. Discussion of the related group differences is included.

Hypothesis I stated: There will be a significant increase in knowledge acquisition among the three patient-teaching groups compared to the no teaching group. Hypothesis I was supported. As shown in Table 6, the posttest 1 mean score of the no teaching group was 51.13 which was lower in comparison to the range of 62.88 to 69 in mean scores of the three teaching groups. Further, a significant ($p < .05$) difference was found among the groups by ANCOVA when controlling for the initial differences in pretest scores as shown in Table 7. Upon finding this difference, a planned comparison (Kirk, 1968) was conducted to test the difference between the average of the adjusted means on the posttest 1 scores of the three teaching groups (1, 2, & 3) with the control group (4). The adjusted mean posttest 1 score of group 4 was significantly different ($p < .01$) from the average of the adjusted means of groups 1, 2, and 3. The results indicated that a significant increase in knowledge acquisition among the three patient-teaching groups was found when compared with the control group which received no teaching.

As in the present study, several studies in the cardiac literature demonstrated knowledge gains by the taught groups when compared with control groups (Gregor, 1981; Milazzo, 1980; Soflin, et al., 1977). From the present study and the literature, it was apparent that persons with cardiac disease who had access to standardized content, regardless of the type of instructional method or materials, demonstrated increased knowledge acquisition when compared to persons who had access only to the routine information available in the hospital environment.

The mean posttest 1 score at 51.13 of the no-teaching group was

Table 6

Means and Standard Deviations of Knowledge Tests

For Treatment Groups 1, 2, 3, and 4

	Treatments				
	Combined N = 32	Group 1 N = 8	Group 2 N = 8	Group 3 N = 8	Group 4 N = 8
Pretest					
Mean	44	44.5	42.75	45.13	43.63
S. D.	13.69	12.70	10.24	13.45	19.46
Posttest 1					
Mean	62.16	65.63	62.88	69	51.13
S. D.	15.41	11.89	12.48	14.85	18.07
Posttest 2					
Mean	65.56	69.63	63.75	68.63	60.25
S. D.	12.04	11.16	12.01	12.85	11.93

Table 7

Analysis of Covariance for Knowledge Acquisition among Cardiac Subjects (N = 32)

Knowledge Acquisition: Pretest to Posttest 1

Analysis of Covariance (Pretest as covariate)

Source	SS	df	MS	F
Between groups	1325.77	3	441.92	3.47*
Within groups	3436.42	27	127.28	
Total	4762.19	30		

* $F(3, 27) = 2.97$ $p \leq .05$

higher than the mean pretest score of 43.63. Test sensitization from the administration of the pretest probably occurred. After the pretest administration, the subjects of the control group may have been stimulated to acquire specific medication information from the routine sources in the hospital environment. In the studies by Milazzo (1980) and Soflin, et al., (1977), pretest sensitization was not demonstrated by the posttest 1 scores of the control groups. However, Gregor (1981) described a testing effect for her control group. In Gregor's study the knowledge mean score at the posttest 1 administration was only slightly greater from the pretest mean score in the control group. In the present study and in the study by Gregor (1981), though test sensitization probably had an effect on the increased posttest 1 mean scores of the control groups, the increases were not as great as the posttest 1 mean scores of the groups who received teaching.

The short period of time of two days between the pretest and posttest 1 administrations may not have allowed enough opportunity for the control group to acquire the specific medication information necessary to increase the knowledge acquisition scores to the levels of the taught groups in the present study. The interval between the test administrations in the studies by Gregor (1981), Milazzo (1980) and Soflin, et al., (1975) was at least two days to most subjects, as well. From the literature and the present study the short period of time between the pretest and posttest 1 administrations may not have allowed enough opportunity to the control groups to learn the information.

In summary the three patient-teaching groups in the present study

were found to have significantly higher knowledge acquisition scores than a control group which received no teaching. This finding was similar in the teaching literature related to patients with cardiac disease. The time interval between the two test administrations may have been too short to allow sufficient learning by the control group through the routine regimen of the hospital. The control group's posttest 1 mean score was higher than the pretest mean score indicating that test sensitization may have occurred.

Hypothesis II stated: Persons in the decision-making group will show a significant increase in knowledge acquisition over the other two patient-teaching groups. Hypothesis II was rejected. As shown in Table 6, group 2, the decision-making group, had the lowest mean posttest 1 knowledge score when compared with groups 1 and 3. By a Tukey's test (Kirk, 1968), a posteriori comparison, there were no significant differences found between groups 1 and 2, 2 and 3 and 1 and 3. Therefore, regardless of the amount of control afforded the learner, these three strategies were found to be comparable on their knowledge acquisition scores.

It was anticipated that the decision-making method, which allowed a medium degree of learner control through the mutual participation of the learner and teacher in the instructional process, would greatly enhance the learning of older hospitalized persons with chronic cardiac illness. However, it is apparent from the results that hospitalized subjects with chronic cardiac illness learned equally as well from instructional methods which allowed low (lecture) and high (self-directed) degrees of learner control. These results indicate that the degree of control

allotted the learner in instruction may not make a difference on the knowledge outcomes for this group of patients. It may be that Snow's (1980) continuum of learner control may not be useful in understanding instructional situations which involve hospitalized chronically-ill persons.

Only one study by Barbarowicz, et al., (1980) compared two teaching strategies which differed in the degree of control allowed the learner over the instructional aspects. The experimental group, which had access to several slide/tape programs and a booklet and had a high degree of control allotted the learner, had greater knowledge test increases than the comparison group which participated in a one-to-one lecture-discussion by a nurse and which allowed a varying degree of learner control. However, the comparison strategy in Barbarowicz, et al., received unstructured teaching which may have varied from subject to subject in the content, process, timing, duration and style, in addition to the degree of control allotted the learner. The present study compared three strategies which varied in the degree of control allotted the learner but which were each defined as to their specific characteristics for systematic implementation from subject to subject.

It may be also that the decision-making strategy which allows a medium degree of learner control may be difficult to assess by paper and pencil tests of knowledge content. For example, in Hallburg's (1969) study, medical outpatients who participated in a decision-making strategy failed to demonstrate significant knowledge increases from a control group who received the clinic routine. However, through

compliance measures obtained through patient reports, the incidence of serious errors by the decision-making group was less than the control group. In Norell's (1979) study of outpatients with glaucoma, the experimentally-taught group which participated in selected parts of the instructional strategy showed a significant ($p < .01$) increase in medication compliance when compared to a control group which had no teaching.

Since instructional aspects are mutually shared by the teacher and student in strategies allotting medium degrees of learner control, many ideas and questions are pursued that may not be directly tested through tests for knowledge which are constructed by the teacher from content prior to instruction and often not individualized to the particular subject's situation. The lack of significance in knowledge acquisition mean score of the decision-making group in the present study may be the result of the inability of the knowledge tests to measure the effectiveness of interactive strategies which allow a medium degree of control to the learner and in which the teacher and learner mutually participate in the instructional process.

In the present study, there were no significant differences found among the teaching groups. A factor which may have contributed to the results was that the instructional content available to each of the three patient teaching groups was the same. In the cardiac education studies by Bracken, et al., (1977) and Haggerty, et al., (1978), the instructional content was the same for all groups regardless of instructional method. Similar knowledge scores were found in the compared groups. In the study by Barbarowicz, et al., (1980), however,

the instructional content varied to the groups and may have been a factor in the knowledge differences found between the two groups. The results of the present study support Bracken, et al., and Haggerty, et al., who indicated that knowledge acquisition of similar instructional content can occur through the implementation of diverse teaching strategies.

In the literature, knowledge gains have often been shown by hospitalized cardiac subjects who received relevant information about their cardiac regimen by various patient education programs (Barbarowicz, et al., 1980; Deberry, et al., 1975; Gregor, 1981; Guzzetta, 1979; Linde & Janz, 1979; Milazzo, 1980; Rahe, et al., 1975; Rankin, 1979; Soflin, et al., 1977). From the literature and the present study, it is apparent that hospitalized persons with chronic cardiac illness show an interest in acquiring relevant information about the therapeutic management of their illness.

Hypothesis III stated: There will be a significant increase in knowledge retention among the three patient-teaching groups compared to the no teaching control group. Hypothesis III was not supported. There were no significant differences among the four groups by ANCOVA (See Table 8). Hypothesis IV stated: The decision-making group will show a significant increase in knowledge retention over the other two patient-teaching groups. Due to the aforementioned nonsignificant F in the ANCOVA which showed no differences among the four groups, hypothesis IV was also rejected. The results indicated that there were no significant differences among the four treatment groups on the posttest 2 knowledge

Table 8

Analysis of Covariance for Knowledge Retention among Cardiac Subjects (N = 32)

Knowledge Retention: Pretest to Posttest 2

Analysis of Covariance (Pretest as covariate)

Source	SS	df	MS	F
Between groups	427.60	3	142.53	1.01
Within groups	3793.52	27	140.50	
Total	4221.13	30		

scores having controlled for the initial differences on the pretests.

All three of the teaching groups, regardless of the degree of learner control allotted in the instruction, maintained their initial knowledge score gains as may be seen in Table 6. It appears that medication teaching of chronically-ill persons in the hospital has lasting benefits in terms of knowledge for the management of medication regimens at home.

In the cardiac patient education literature, several studies demonstrated increased knowledge retention scores by groups who received instruction and testing (Barbarowicz, et al., 1980; Gregor, 1981; Linde & Janz, 1979; Rankin, 1979; White, et al., 1980). However, many factors may have additionally influenced the knowledge retention scores of the subjects including the daily administration by the subjects of their medications which reinforced the instruction and the expectation by the subjects of a home visit by the nurse researcher which encouraged them to review the medication information available on their cardiac medication containers.

In the present study the knowledge tests were designed to test knowledge content available to all the taught groups regardless of the strategy. The present study controlled many instructional aspects while allowing for variability in learner control among three defined teaching strategies. The results of the study indicated that all three teaching strategies were effective in retention of medication knowledge. In the studies by Barbarowicz, et al. (1980), and Rankin (1979), the knowledge retention of the differently-taught groups was similarly maintained.

Several factors may account for increases in posttest 2 knowledge scores of the control group. Test sensitization most likely occurred to the subjects of group 4 through the repeated test administrations of the pretest and posttest 1 in the present study. Between the first two administrations in the hospital, the subjects probably did not have time to acquire a significant amount of knowledge to affect the posttest 1 scores. However, by the time of the posttest 2 administration, the subjects had time to seek additional information in order to correct their lack of knowledge as demonstrated in the pre- and posttest 1. Though the knowledge tests were different at each administration, the same objectives for medication knowledge were tested in each form. Also, these subjects anticipated a home visit by the nurse researcher. In the literature, the control group in the study by Gregor (1981) showed a test effect on the knowledge retention test. In the studies by Barbarowicz, et al. (1980), and Rankin (1979), the groups who received the lecture-discussion by a nurse and the pamphlet, respectively, showed increased knowledge retention scores from their knowledge acquisition scores. Knowledge tests were administered repeatedly in these latter three studies.

In summary, the teaching of cardiac subjects resulted in knowledge acquisition regardless of the particular strategy or the degree of learner control. The knowledge retention scores of the three teaching groups continued to be similar to the knowledge acquisition scores. However, the knowledge tests appear to have sensitized the control group, which received no instruction, to learn about the medication

content. The knowledge retention scores among the taught groups and the group which had not received teaching were not found to be different.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Hospitalized persons with chronic cardiac illness frequently need instruction about their prescribed medications in order to manage their medication regimen when they return home. The nursing profession accepts patient teaching as a nursing-care responsibility; however, information is not available for nurses to know the most effective way of giving this instruction.

The purpose of this study was to determine the most effective method to teach self-administered prescribed medications to hospitalized chronically-ill persons with cardiac conditions in terms of outcomes related to knowledge acquisition and retention. Thirty-two hospitalized cardiac patients between the ages of 45 and 82 who met the criteria for selection from three hospitals were included in the study. Within each hospital, the subjects were randomly assigned to four teaching treatments and closely matched for drug difficulty, length of illness, and memory function. These procedures were effective in controlling selected attributes of the subjects which could affect the learning outcomes. The groups were found to be comparable on selected demographic, illness and personality variables.

An experimental pre- and posttest with control group design was used. The three teaching treatments were ordered along a continuum of

learner control of the content and process of instruction. The teaching treatments consisted of: Strategy 1, the lecture method which allotted a low degree of learner control; Strategy 2, the decision-making method which allowed a medium degree of learner control; and Strategy 3, the self-directed method which allotted a high degree of learner control. The additional treatment group, Strategy 4, consisted of subjects who received routine care and served as a control group. Each teaching treatment consisted of similar content based on teaching objectives for safety and two of three specified medications, digoxin, diuretic, and potassium replacement. The dependent variable was measured by the use of three alternate forms of knowledge tests for each of the two medications and safety which were administered in random order before teaching (pretest), one day after teaching (posttest 1), and approximately two weeks after hospital discharge (posttest 2). The control group was tested in the same sequence as the teaching groups.

Four hypotheses were tested. Hypothesis I stated: There will be a significant increase in knowledge acquisition among the three patient-teaching groups compared to the no-teaching control group. By analysis of covariance (ANCOVA) with the pretest as a covariate, it was shown that the posttest 1 knowledge scores of the teaching groups were significantly greater than those of the control group. Therefore, hypothesis 1 was accepted. Hypothesis II stated: Persons in the decision-making group will show a significant increase in knowledge acquisition over the other two patient-teaching groups. A posteriori comparison, Tukey's test, resulted in no significant differences in knowledge acquisition among the three teaching groups. Therefore,

hypothesis II was rejected. Hypothesis III stated: There will be a significant increase in knowledge retention among the three patient-teaching groups compared to the no-teaching control group. The ANCOVA with the pretest as a covariate resulted in no significant differences among the four groups on posttest 2 scores. Therefore hypothesis III was rejected. Hypothesis IV stated: The decision-making group will show a significant increase in knowledge retention over the other two patient-teaching groups. Due to the overall nonsignificant differences among the four groups in knowledge retention by ANCOVA, hypothesis IV was rejected. Of interest in these findings is the fact that the three teaching groups maintained their knowledge gains from posttest 1 to posttest 2. However, no significant differences were found on posttest 2 between the teaching and no-teaching groups as the control group had gained appreciably in knowledge between the two posttests. It is probable that test sensitization contributed to these increases by the control group.

Conclusions

The findings of the present study can lead one to make several conclusions including the following: (1) many hospitalized persons do not get sufficient instruction by the usual hospital routine; (2) patients who meet selected criteria in regards to memory function and non-acute stage of cardiac illness can effectively learn during their hospitalization; (3) learning can occur by one of a variety of planned, systematic teaching strategies which incorporate content from the same

instructional objectives; (4) the increased knowledge acquired as a result of the teaching can be retained and thus used at home in the safe administration of a medication regimen; (5) patients who receive testing but not teaching can be sensitized to seek additional information. Only with caution can one generalize these findings to other situations.

Since all three strategies were shown to be effective in knowledge gains, the selection of an appropriate teaching strategy can be made on the basis of other factors such as the availability of materials, the amount of time available for instruction, the specific needs of the individual patient, and various learner characteristics which require instructional adaptation.

Recommendations

The results of the present study suggest a number of recommendations for future research of patient teaching by systematic strategies. Recommendations for further studies include the following:

(1) Replication of the present study with addition of a posttest only control group to assess the impact of pretest and pre-posttest 1 sensitization on knowledge acquisition and knowledge retention, respectively.

(2) Inclusion of dependent variables which measure behavioral outcomes resulting from teaching in further studies of teaching strategies. This recommendation is especially made for studies that include methods which encourage the mutual participation between the learner and teacher in planning a safe home medication regimen, as in the decision-making and

tailoring methods.

(3) Replication of the present study to a larger sample to eliminate the potential effects of small group sizes.

(4) Replication of the present study with samples having other chronic illnesses.

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Appendix A

Informed Consent Forms

UNIVERSITY OF OREGON HEALTH SCIENCES CENTER
SCHOOL OF NURSING

Physician Consent
for
Patient Participation
in
Patient Teaching Research Study

As a group of Nurse Researchers at the University of Oregon Health Sciences Center, we are requesting your permission to ask your patient

_____
First Name Last Name

to participate in a patient teaching study. The study aims at finding the best way to teach patients with cardiac illness about their prescribed medications, approximately 4 days prior to discharge from the hospital. The intent is to enable these patients to adhere to their medication regimen upon their return home. The patient will be randomly assigned to a control group or one of three teaching strategy groups. The patient assigned to a teaching strategy group will be taught the safety factors in taking medicines, as well as information specific to either Digoxin, a diuretic drug, or KCl. The head nurse on this unit has examined the content to ensure that the information is compatible with the current information given to your patients. Any questions that you may have about the protocol will be answered by one of the nurses conducting the study. (Denise Demaray, R.N., B.A. and Mary Shick, R.N., B.S.)

We expect that the usual information about the prescribed medication will be given to the patient by the medical and nursing staff of the hospital.

Please sign below if you agree to your patient's participation. If you agree, the patient will be given a consent form to sign and will be given an explanation of the research program.

_____
Physician's Signature

_____
Date

ls
5/16/79

CONSENT FOR HUMAN RESEARCH PROJECT

I, _____, herewith agree to serve as
(First Name) (Middle Initial) (Last Name)

subject in the investigation named, Patient Teaching: A Trait-Treatment Interaction Strategy, under the supervision of Dr. May Rawlinson and Virginia Cory, R.N., M.N. The investigation aims at finding the best way to teach particular types of patients about their self-administered prescribed medications.

It is my understanding that I will participate in a planned, systematic teaching method to learn more about the medications the doctor has ordered in my treatment. I will be required to answer some questions during an interview and to complete paper and pencil tests. The questions relate to my knowledge of and practice in taking prescribed medications. The paper and pencil tests are commonly used personality tests. The time required for my participation will not exceed one hour a day for four consecutive days prior to discharge from the hospital. After I have returned home, I will be visited by one of the research workers for an interview that will take about an hour.

All information that I give will be handled confidentially. My anonymity will be maintained on all documents, which will be identified by means of code numbers.

I may benefit from these procedures by knowing more about the medications that the doctor has ordered for me to take when I leave the hospital.

Denise Demaray, R.N., B.A. and Mary Shick, R.N., B.S. have offered to answer any questions I might have about the procedures I am submitting to.

It is not the policy of the Department of Health, Education and Welfare, or any other agency funding the research project in which you are participating, to compensate or provide medical treatment for human subjects in the event the research results in physical injury. The University of Oregon Health Sciences Center, as an agency of the state, is covered by the State Liability Fund. If you suffer injury from the research project, compensation would be available to you only if you establish that the injury occurred through the fault of the Center, its officers or employees.

I understand that I am free to not participate or to withdraw from participation in the investigation at any time without this decision otherwise affecting my relationship with or medical treatment in the hospital.

I have read the above explanation and agree to participate as a patient in the study described.

Signature: _____

Witness: _____

Date: _____

MR:ls
6/5/79

Appendix B

Scripts of Lectures

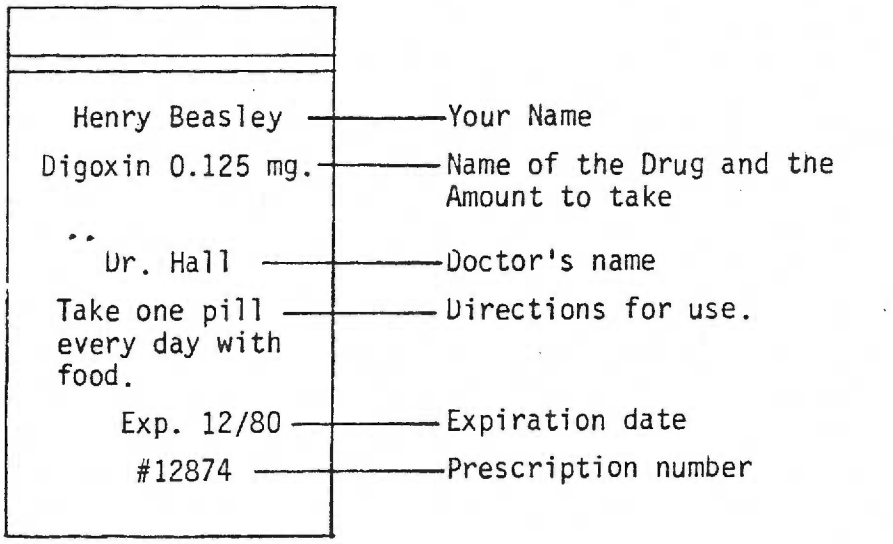
Safety in Taking Medications

Today, first of all, I will give you some general information about safe methods for taking and storing medications and the terms used regarding medicines. This information applies to any medicine you are taking.

For each medicine you are taking, it is important for you to learn:

1. The name of the medication you are taking.
2. How much medication you take and how often.
3. The side effects you might have from the medication.
4. The warning signs you might have from the medication.
5. The warning signs that should be reported to your doctor or clinic before continuing taking the medicine.

Later, I will give you specific information about each medicine you will take. But first you should know what information is on the label of each bottle of prescribed medicine. (Draw a bottle with a label on a piece of paper while talking.)



The label has the following information:

1. Your name.
2. The name of the drug and the amount (dose) of each tablet or pill.
3. The name of the doctor who prescribed the medicine.
4. The direction for taking the medicine - For example: "Take one pill every day with food"; "Take one pill three times a day", is stated.
5. The expiration date of the medicine, (point out on the label how it is written). The expiration date is the date after which the medicine may no longer be effective.

6. The number of the prescription. It is the pharmacy's record of the prescription. The number is given to the registered, licensed pharmacist when you obtain a refill of the medication.

   Obtaining a new supply of medicine is termed a refill. The doctor's prescription gives directions to the pharmacist for the number of times the quantity of medication can be refilled without a new prescription. For example, on the doctor's prescription he directs the pharmacist to refill your medication one time or two times.

The prescription is the doctor's written order for a medication which he wants you to take. A prescribed medication is that which the doctor has ordered and a registered, licensed pharmacist can fill and sell to you. Other medicines are called "over-the-counter medicines" and can be purchased from a pharmacy or store without a prescription.

Now, I'm going to talk about side effects. Side effects are actions a drug has on you other than the ones it was intended to have such as drowsiness. Not all patients develop side effects. The medicine is usually still taken as directed even though these side effects do occur. For instance, many cold medicines may clear up your runny nose and headache but may also make you drowsy. The drowsiness is not the intended drug action but a side effect from taking the drug. You should know if there are side effects of the medicine you are taking and if there are any activities (such as driving) that you should not do while taking the medicine.

Warning signs are different from side effects. Warning signs are symptoms which you may experience and which might mean the doctor needs to change the dosage of the medication you take. Each drug has different warning signs. Find out what the warning signs are of the medication(s) that you take. Call your doctor as soon as any warning signs occur.

I'm now going to tell you about storing your medicine when you get home.

1. Store medicine in a cool, dark, dry place out of the reach of children. Dispose of all expired medications and medications no longer used by flushing them down the toilet.
2. Keep each medicine in the original separate pharmacy labeled container.
3. While taking medications there are several items to read on the label to measure safety. Each time you take the medicine, always check the label of your medication to be certain that it states the same medication, the same amount and the same way to take it as your doctor told you. Ask the pharmacist about any changes.

   Always check the label of your medication to be sure that you're taking the right medication at the right time before you swallow the medication. Many pills look alike and come in similar containers. Some should be taken at specific times, for example, in the morning, with food or only with water between meals.

Check the label of your medication to be certain that it is not past the expiration date which tells you when the drug may no longer be effective.

Always check the bottle to be sure that the label is intact and can be read. If you are taking a liquid medication always pour it away from the label so it won't drip and smear the printing. If the label does smear and can no longer be read or falls off, call your doctor to write another prescription, and after you get the new medication, flush the old medication down the toilet.

(You may list these on paper.)

4. It is a good idea to keep a daily record and mark it each time you take your medication. This helps you to remember your medication to take the right amount. Include the following in your medication record:

   a. Name of the medication

   b. Amount of the medication

   c. Date you take the medication and

   d. the Time you take the medication

   (You may write on paper a sample of a record.)

MEDICATION RECORD FOR _____
(Month(s) and Dates)

Day of Mo.	Medications	Weight	Pulse	Times Medication Taken

5. It is important to remember to take the EXACT amount ordered. Don't skip doses or stop taking the medicine without checking with your doctor. If you lose medications or leave them behind, contact your doctor to write or phone a prescription for you.

6. Do not take extra doses or try to "catch up". Most medicines don't work that way and may even make you ill. Usually if you forget a medication dose, take your usual dose the next time it is due. However, if you take a medication only once a day in the morning and it is noon when you remember you haven't taken it, take the drug as soon as you can. Ask your doctor, nurse or clinic if you have questions.

The following are safety measures to be aware of while taking medications. Check with your doctor or pharmacist before taking any other medicines or alcohol. The effects of a drug may also be altered by alcohol. Ask your doctor if the drugs you are taking are affected by alcohol. Be sure to show a record of your medications to any doctor or dentist who wants to prescribe a drug to you. Prescription medications, such as antibiotics, are those a physician or dentist has ordered (prescribed) the person to take for a specific condition. Many over-the-counter drugs can affect the way prescribed medication works. Over-the-counter drugs are those a person can get without a prescription such as aspirin, antacids, and laxatives.

If you get ill or have any warning signs that might have been caused by tne medicine, don't hesitate to call your doctor or nurse before taking your next dose.

Renew your prescription before the last pill is gone or before the expiration date is up.

Bring your medication and your records with you when you visit the doctor. If a change in your medication is needed, have the doctor or pharmacist cnange the label on the bottle.

Check with your doctor, nurse, or pharmacist to see if you need to wear a medic-alert bracelet to let other medical people know you take that medication, expecially in the event where you are unable to talk for yourself.

If you develop an allergy to any medication, be sure to inform doctors or dentists of the allergy.

In summary I have explained the information to be found on the label on each bottle of prescribed medicine; the terms: prescription, prescribed medicine, over-the-counter medicine, expiration date, prescription number, refill, side effects, warning signs; how to store medicines, read the label of bottles of medicine before taking, how to keep a record of medicine taken and general safety measures.

Do you have any questions?

Digoxin

Greet patient and see that he/she is comfortable.

Today I am going to give you information about the medicine Digoxin (Lanoxin) - (use name as ordered) - which your doctor has ordered for you to take when you go home. It is very important that you learn about the medicine and how you should take it so your heart will function better.

After I tell you about the medicine you can ask questions and I'll answer them.

Digoxin and Lanoxin are the same medicines. They are trade names for digitalis. This medicine comes in small colored pills according to disage (or the amount of the drug in the pill: 0.125 milligrams (abbreviated mg) is yellow, 0.25 milligrams is white, 0.50 milligrams is a green pill. Your physician has ordered Digoxin, _____ milligrams, the _____ pill for you to take once a day. (On paper pad, fill in with patient's prescription.)

Digoxin has two main effects on the heart. It makes your heart a better pump. Your heart is a large muscular organ which beats to pump blood from the heart through large and small blood vessels to all parts of the body and back again to the heart and lungs. Digoxin improves the force of this pumping action. It makes your heart beat more slowly and regularly. With a regular rate of the heartbeat the blood circulates through the body effectively.

Usually the doctor's prescription is to take your digitalis once every day.

Your doctor may ask you to take your pulse each time before taking Digoxin. To take your pulse, place the first two fingers of your right hand on the inner side of your left wrist at the base of your thumg. Press lightly to feel the beat of the artery. This is your pulse. Then: count the number of beats for sixty seconds. The number of times your artery beats a minute is your pulse rate. Note if the rhythm of the pulse beat is regular or an irregular, uneven beat or it it skips beats. Record your pulse rate and the rhythm of your pulse. (Demonstrate on yourself only.) Ask your nurse to help you practice taking your pulse. After recording your pulse rate and rhythm and if they are within normal limits, take your Digoxin. If you are uncertain about your pulse, don't take your Digoxin. Wait a half hour (30 min.) Take your pulse again. If the pulse is now within normal limits take your Digoxin. The normal limits are (1) a pulse rate over 55 and under 110, (2) less than 8 skipped beats in one minute, and (3) a regular beat or rhythm. A spouse, a member of the household or a neighbor who has learned how to count the pulse rate may check your pulse rate if you are in doubt.

Digoxin should be taken at the same time each day. Plan a regular schedule for yourself by taking it during or after a meal. Take only the amount ordered for you and written on the prescription bottle. Never skip a dose of Digoxin without your doctor's knowledge. Never take an extra dose of Digoxin without your doctor's knowledge. If you forget to take your Digoxin at the usual time, but remember later that day, you should take the full dose as soon as possible.

I am now going to tell you about the warning signs of your Digoxin. You may recall what I told you about what a warning sign is. "A symptom you experience which may indicate the amount or type of medication you are taking needs to be changed."

It is possible that you may need a change in your dosage of Digoxin. Be aware of the following warning signs which may occur if you're taking too much or too little Digoxin. Remember to call your doctor as soon as they occur.

The following warning signs may indicate that you're not getting enough Digoxin. Continue taking your medication and call your doctor if any of them occur.

1. an increased swelling in your feet and legs.
2. a sudden unexplained weight gain: more than four pounds in two days or 8 pounds in one week.
3. an increased shortness of breath.

These next warning signs may indicate that you're getting too much Digoxin.

1. Changes in your vision such as bluriness or a yellow haze or spots.
2. Nausea, vomiting, or diarrhea which lasts more than two days.
3. A pounding heart or more than 8-10 skipped beats in 60 seconds, if this is unusual for you.
4. Unusual drowsiness or weakness.
5. A pulse rate of less than fifty-five (55) beats in one minute or more than one hundred ten (110) beats in one minute.

(May list these in 2 columns on paper.)

Now I am going to tell you about the fact that some medicines (drugs) interfere with the effects of other medicines. Now that you are taking Digoxin, be sure to tell other physicians or dentists who are treating you for other conditions that you are taking Digoxin. Then they can plan appropriate treatment. Your doctor will tell you what medicines you should not take while you are taking Digoxin.

Your doctor has prescribed another medicine, (Potassium Chloride or a diuretic-find out which one the patient has ordered) which I will tell you about later - to take with your Digoxin for your present condition. These medicines are carefully balanced by your doctor and both should be taken exactly as directed.

In summary I have talked about Digoxin and the information that it is important for you to remember.

1. Know how much you take and how often.
2. Learn how to take your pulse and check it before taking your Digoxin, if your doctor asks you to.
3. Record your pulse rate and rhythm.
4. After taking the pill, record the dose, the time, the date, and the medication name - Digoxin.
5. CALL YOUR DOCTOR OR CLINIC IF YOU HAVE ANY OF THE WARNING SIGNS.

Do you have any questions?

Potassium Chloride

I have talked with you abour safety methods of taking and storing medicine and about the other medicine the doctor has ordered for you fill in (Digoxin or duiretic).

Now I will give you information on Potassium Chloride, a medicine often used in combination with _____ (Digoxin or diuretic). I'll explain why. Then you can ask questions.

Potassium and chloride are chemicals normally found in your body. They are necessary for proper muscle, nerve and heart function. In your body and in medicine form, these two chemicals are combined together and ca-led potassium chloride. Potassium Chloride is also called KCl, the chemical abbreviations for Potassium Chloride. They are the same medication.

(Write terms: potassium chloride and KCl on paper.)

While you are taking Digoxin or a diuretic ("water pill") you may lose more of your body potassium than usual in your urine. The Potassium Chloride medicine replaces potassium chloride in the body, which is necessary for normal body functioning.

Potassium chloride of KCl comes in pill, powder, or liquid form. Don't be surprised if you get another form from a different pharmacist. Take only the amount your doctor has prescribed for you. The amount of each dose is measured in milliequivalents (mEq) and can be found on the medicine container label. You are to take _____ milliequivalents _____ times each day.

Follow the instructions carefully on the label about how to mix the Postassium Chloride with juice or water. The liquid and powder forms and most of the tablet forms of Potassium Chloride are to be mixed before taking them. The medicine, even when mixed, will taste salty.

It would be best to take your medication with or just after a meal. A common side effect of Potassium Chloride is an upset stomach and taking the medication with or after a meal helps protect your stomach. If you can't eat something, take Potassium Chloride with a cup of water, except if you must limit your fluids.

Keeping a daily record of when you take your medications will help you to remember to take them. Check off after each time you take your medication so that you know you've taken that amount.

Potassium Chloride medicine is changed by heat and light. Therefore, keep the liquid KCl in a dark bottle away from the heat. Also, keep the packets of KCl away from heat.

Throw away any Potassium Chloride that is past the expiration date and replace it with a new prescription.

The amount of Potassium Chloride and the amount of _____ (Digoxin and diuretic) which the doctor has ordered for you is carefully balanced. When the amount of one medicine is changed the amount of the other may also be changed. Do not change the amount of either medicine without talking with your doctor.

There are some warning signs which may indicate that the amount of KCl you are taking needs to be changed. They don't occur often, but if you believe you may be having any of the following warning signs, call your doctor.

1. Painful muscle cramps, especially in the legs.
2. Persistent abdominal pain, nausea, vomiting or diarrhea.
3. Rapid pounding heart beats, or anything unusual about your pulse.
4. Weakness, tingling or numbness in arms or legs.
5. Feeling woozy, lightheaded, or listless.

(May be listed on paper.)

I'll review some of the facts I've told you about Potassium Chloride. Potassium Chloride - KCl - is a medicine taken to replace the potassium in the body when potassium is lost in your urine. Potassium loss often occurs when a person is also taking _____ (Digoxin or Diuretic). The doctor has prescribed the amount of KCl which is calculated to replace the amount of potassium lost. Take this exact amount.

It is suggested you take the medicine mixed with juice or water and with or just after a meal.

I have listed the warning signs and if these occur you should phone your doctor.

Do you have any questions?

Diuretic

Today I am going to give you some information about the diuretic the doctor has ordered for you to take when you go home. You will be taking this medicine as well as (Digoxin) or (Potassium Chloride). (Select appropriate 2nd drug.) Both should be takne for your present condition.

Diuretics are often called "water pills" because they help remove excess body water and sodium. Sodium is normally used by the body to retain fluids necessary for functioning. It is in most foods, but table salt is the major source of sodium.

There are many different types of diuretics. Furosemide and hydrochlorotniazide are examples of duiretics. Their trade names are Lasix and Hydrodiuril, respectively.

You are to take _____ , also called _____
Name of diuretic -(generic) Trade name

_____ mg, _____ time(s) per day. (Select the specific drug and dose for the patient(s) you are talking with).

When the heart is not pumping well, the body begins to keep more sodium than it needs. This increased sodium causes more water to stay in your body. This extra fluid may collect in your feet and legs, in your lungs, or in other body tissues. It may also raise your blood pressure or cause a sudden weight gain.

The diuretic or "water pill" will help get rid of this extra sodium and water through your kidneys. Your breathing may become easier, your feet and legs less swollen, and your blood pressure and weight may decrease.

Diuretics may also be given to treat high blood pressure.

When you take the diuretic you may pass your urine more frequently than usual. After taking the diuretic pill, it starts working in about one hour and lasts six to eight hours. Therefore, you should take your diuretic early in the day so you won't have to get up as often at night. Also, be certain you're near bathroom facilities.

As you lose excess water you may also lose weight. At first the weignt loss may be rapid. After the first week or two, your weight will stabilize and should not vary by more than a few pounds.

Your doctor may ask you to weigh yourself <u>daily before</u> taking your diuretic and keep a written record of your weight. This way, both you and the doctor will know the exact amount of weight loss, and he may use this information in deciding on adjustments in your medicines.

Each day at the same time you should weigh yourself on the same scale with the same amount of clothing on. This is done to get the most accurate daily weight. Record your weight right after weighing. After the first week or two, your weight should have stabilized. Then if you gain or lose more than 4 pounds in two days or 8 pounds in one week after the first couple weeks, notify your doctor or clinic.

Take the exact amount of diuretic as ordered and as often as ordered. The name of the medicine you are taking is _____, the amount you take is _____ milligrams, and you should take it _____ time(s) a day. This information is also on the label of your medicine bottle. To help you remember, keep a daily medicine record with the name of the medicine, the amount taken and the times taken.

If the diuretic is given because of extra fluid and you take less than prescribed, you will retain fluid again. However, if the drug is being taken for high blood pressure only, stopping the drug may have no effect on weight or water retention but the high blood pressure may return.

If you take more than prescribed you may lose too much salt and water and lower your blood pressure too much. This may cause you to be dizzy and woozy when you stand up.

If you forget a dose of medication, take it as soon as you remember. However, if it's nearly time for your next dose of medication, omit the forgotten dose of medication. Record that you missed it on your daily medication schedule.

Although the diuretic is given to you to help remove excess body water and sodium, an expected side effect which often occurs is loss of potassium through the kidneys in the urine.

Potassium is needed by the body to help the heart, muscles and nerves work normally. Your doctor may either give you a prescription for Potassium Chloride (KCl) or suggest eating foods that have large amounts of potassium in them. Some foods with substantial amounts of potassium are bananas, oranges and orange juice, tomatoes, raisins, prunes, and dried apricots. Remember the potassium and diuretic balance each other. Continue taking Potassium Chloride or eating high potassium foods while taking a diuretic.

Occasionally the amount of diuretic you are taking needs to be changed and you may experience warning signs.

If you are taking too much diuretic medication for your body, potassium, sodium, and water losses may cause you to experience:

1. unusual muscle weakness, cramps, or tingling.
2. nausea and vomiting.
3. an unusually persistent thirst or decrease in your urine output even when drinking the same amount of fluids.
4. lightheadedness or dizziness when you stand up.

Call your doctor or clinic if you have any of these warning signs.

On the other hand, if you experience:

1. a sudden weight gain - more than 4 pounds in two days or 8 pounds in one week,
2. shortness of breath,
3. swelling in your feet and legs,

this may indicate your body is still retaining too much sodium and water. Your amount of diuretic medication may have to be increased. Continue taking your prescribed amount of medication and call your doctor if any of these warning signs occur.

I have explained that a diuretic is given to you to help remove excess body water and sodium; also potassium may be removed. You should take the exact amount as ordered by your doctor so that you lose the calculated amount of sodium and water. If warning signs of too little or too much sodium and water loss occur call your doctor.

You can expect to urinate more frequently and may lose weight.

You should take the medicine at the same time each day and if the doctor asks you to weigh daily, this should be at the same time each day before taking the medicine.

Do you have any questions?

Appendix C

Strategy 2 Checklists

STRAGETY 2 CHECKLIST

SAFETY IN TAKING MEDICATIONS

MEDICATION LABEL STATES		
name of medication		
amount to take		
directions for taking		
your name		
doctor's name		
prescription number		
expiration date		
CHECK MEDICATION LABEL		
to be certain states what Dr. told you-same med., same amt. and same way to take it		
before taking drug each time-right med. at right time		
to be sure drug still effective		
to be sure can read it and that it is intact		
liquid medications		
if smeared or label falls off, call pharmacist to make a new label		
STORAGE		
keep all drugs in separate pharmacy labeled containers		
keep in cool, dark, dry place out of children's reach		
dispose of expired meds and meds no longer used by flushing down toilet		
DAILY RECORD		
name of med, dosage, date and time taken, pulse, weight		
mark after each time take med		
CLINIC VISITS		
bring meds and records		
if changes made, have Dr. or pharmacist change the label on bottle		
DON'T SKIP OR STOP TAKING MEDICATIONS		
if lose or leave behind, contact doctor to write or phone new prescription		

DON'T TAKE EXTRA DOSES OR TRY TO "CATCH UP"		
most meds don't work that way and may make you ill		
usually, if forget a dose, take usual dose next time due		
however, if take med once a day and remember it a few hours later, take the drug as soon as possible		
OVER-THE-COUNTER MEDS, ALCOHOL AND/OR OTHER PRESCRIBED DRUGS MAY INTERACT		
ask Dr. if meds affected by other meds or alcohol		
definitions of over-the-counter, prescription medications, prescription		
inform other doctors, dentists, nurses of the medications you are taking		
RENEW PRESCRIPTION		
before last pill gone or expiration date past		
prescription number is pharmacy's record		
registered licensed pharmacist fills/refills prescription		
definition of refill, expiration date, drug profile		
IF ILLNESS OCCURS CALL DR.		
SIDE EFFECTS FROM THE DRUGS		
definition of side effects		
many applications - driver's license and work permits will require that you list medications to ensure own safety		
ask Dr. if meds you are taking have side effects and if there are any activities you shouldn't do		
if any unusual side effects, call Dr. before next dose		
WARNING SIGNS FROM THE DRUGS		
definition of warning signs		
know the warning signs of your medications, if occur, call Dr.		
MEDIC-ALERT BRACELET		
purpose		
check with Dr., nurse, pharmacist to see if need to wear		
ALLERGIES		
inform Dr., nurse, dentist		
QUESTIONS		

STRATEGY 2 CHECKLIST

DIGOXIN

HEART PHYSIOLOGY		
heart function		
medication action		
↑ pumping force - makes heart a better pump		
↓ heart rate		
↑ heart regularity		
digoxin doesn't help heart pain!		
MEDICATION CHARACTERISTICS		
name(s) of medication, Lanoxin = Digoxin		
color, size / strength/amount — yellow 0.125 mg; white 0.25 mg.; green 0.50 mg		
MEDICATION ADMINISTRATION		
take pulse before taking Digoxin (demonstrate pulse taking):		
count beat for 60 seconds = pulse rate		
note irregular or regular beat		
record the rate and rhythm		
ask nurse to help practice this		
if question, have spouse or neighbor check		
take Digoxin:		
if pulse within normal limits		
1) more than 55, less than 110 per minute		
2) less than two skipped beats per minute		
3) a regular beat or rhythm		
if not within normal limits, wait 30 min., take pulse again. If in normal limits take Digoxin, if not call Dr., nurse, or clinic		
same time daily with a meal to remember		
as your Dr. prescribed - do not skip a dose or take an extra dose		
record the name of med., the dose, the time and date taken, pulse		
tell other physicians, dentists that you're taking Digoxin		

WARNING SIGNS		
Too little medication		
continue taking and call doctor		
1. increased swelling feet and legs		
2. sudden unexplained weight gain - more than 4 pounds in two days or 8 pounds/week		
3. increased shortness of breath		
Too much medication		
call doctor before taking next dose		
1. change in vision - blurriness or yellow haze, spots		
2. nausea, vomiting, diarrhea lasting more than 2 days		
3. pounding heart or more than 8-10 skipped beats in 60 seconds if unusual for you		
4. unusual drowsiness or weakness		
5. pulse rate of less than 55 beats per minute or more than 110 beats per minute		
QUESTIONS		

STRATEGY 2 CHECKLIST
POTASSIUM CHLORIDE

PHYSIOLOGY		
K+ and Cl - chemicals normally found in body		
necessary for muscle, nerve, heart function		
diuretics cause ↑ K+ loss, KCl replaces chemicals lost which are necessary for normal body functioning		
MEDICATION CHARACTERISTICS		
name KCl = Potassium Chloride		
forms - liquid, powder, pills		
color/size		
strength/amount (mEq)		
MEDICATION ADMINISTRATION		
mix KCl with juice/H_2O		
tastes salty		
take KCl with or after meal to protect stomach		
store in a cool, dark place. Throw away after 1 year		
record med. name, dose, date, time		
take as long as prescribed by doctor		
if forget dose		
WARNING SIGNS OF TOO LITTLE OR TOO MUCH KCl		
painful muscle cramps, especially in legs		
persistent abdominal pain, nausea, vomiting, diarrhea		
rapid pounding heart beats/unusual pulse		
weakness, tingling or numbness in arms/legs		
woozy, lightheaded, listless feelings		
Action: These don't occur often. Call your doctor if you believe you're having any of these warning signs.		
QUESTIONS		

STRATEGY 2 CHECKLIST
DIURETIC

PHYSIOLOGY		
sodium normally used by body to retain fluids		
↓ heart pump ⇒ ↑ sodium retention ⇒ ↑ H_2O retention		
sodium is in most foods - table salt		
diuretic action		
remove excess body H_2O and sodium		
starts working in 1 hour, lasts 6-8 hours		
MEDICATION CHARACTERISTICS		
name of medication - many kinds of "water pills" Lasix or Furosemide Hydrodiuril or Hydrochlorothiazide		
color/size		
strength/amount (milligrams)		
MEDICATION ADMINISTRATION		
weigh daily on same scale at same time with same amount of clothing, Record		
After 1st week or 2, if gain or lose more than 4 pounds in 2 days or 8 pounds in week, notify Dr. or clinic		
When to take - early in day so don't have to get up at night to void		
record med. name, dose, date, time, weight		
take as long as prescribed by Dr.		
if forget dose		
EFFECTS FROM TAKING DIURETIC MEDICATION		
at first urinate more frequently and lose weight rapidly. Weight stabilizes 1-2 weeks		
K+ loss		
K+ necessary for normal heart, muscle and nerve functioning		
K+ found in Potassium Chloride medication		
K+ in bananas, raisins, oranges, tomatoes, prunes		
K+ and diuretic balance		

Strategy 2 Checklist
Diuretic
Page 2

WARNING SIGNS OF NOT ENOUGH DIURETIC MEDICATION		
body retaining too much sodium and water		
symptoms: excessive weight gain - more than 4 pounds in 2 days or 8 pounds in 1 week		
↑ SOB		
↑ swelling in legs/feet		
↑ B.P.		
action: continue taking diuretic as prescribed and call doctor		
WARNING SIGNS OF TOO MUCH DIURETIC		
↑ K+, Na+, H_2O loss		
symptoms: unusual muscle weakness, cramps, tingling		
woozy/dizzy, lightheadedness		
nausea/vomiting		
persistent thirst or ↓ in urine output		
decreased blood pressure		
action: call doctor before taking next dose of diuretic if have any of these		
QUESTIONS		

Appendix D

Description of Strategy 3 Teaching Materials

Description of Strategy 3 Teaching Materials

All the teaching materials, listed and briefly described below, were available at the patient's bedside from a metal three-shelved cart. The teaching materials included content on general safety measures in taking medications and two of the three cardiac medications taught in the study. The following is a list and brief description of the materials included on the cart.

*1) A slide/tape program which was specifically developed for this project from content similar to that in both the lecture scripts and the checklists of Strategies 1 and 2, respectively. The programs were shown on either a Singer Caramate or a Bell and Howell Ringmaster slide/tape machine. Instructions for the operation of the machine were included.

*2) Acrylic drug boards containing medication samples of each drug.

*3) Pamphlets which were specifically developed for this project from content similar to that in both the lecture scripts and the checklists of Strategies 1 and 2, respectively.

4) Flip charts, commercially available, listed below:
Heart. Robert J. Brady Co., Bowie, Maryland: 1973.
General Medications. Robert J. Brady Co. Bowie, Maryland: 1973.

*5) Monthly medication record form specifically developed for this project and included space for recording the day of the month, medications, weight, pulse, and the times of medication administration.

* For further information regarding these materials contact May Rawlinson, Ph.D., Oregon Health Sciences University School of Nursing, 3181 S.W. Sam Jackson Park Rd., Portland, Oregon 97201.

Appendix E

Strategy 3 Recording Sheet

ID # _____

Recording Sheet for Utilization of Learning Materials

Instructions

These materials have been assembled to help you learn what you need to know about your medications. If you use any of the materials, please write in the total minutes that you spend on them each day.

Type of Learning Material		1st Day Total Minutes	2nd Day Total Minutes	3rd Day Total Minutes
1. Machine with the colored slides and voice tape.	Total Series			
	Safety part			
	Drug*_____			
	Drug*_____			
2. Flip Chart	Renal			
	General Medications			
3. Pamphlets	Safety			
	Drug*_____			
	Drug*_____			
4. Drug Boards (display of actual drugs)	Drug Boards			

* Fill in names of the drugs taught.

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Appendix F

Lists of Teaching Objectives

Instructional Objectives for
SAFETY in Taking Medications

1. To interpret the meaning of commonly used words related to medications including: expiration date, prescribed, refill, over-the-counter.

2. Be able to identify information which is included on the label of a container of prescribed medication including: patient's name, drug name and dose, physician's name, instructions for use, expiration date, prescription number.

3. To distinguish between safe and unsafe practices of storing medicines at home.

4. To identify information which describes the recommended use of medications including: when and how the medication should be taken, frequency, dose, sequence.

5. To identify situations when medications should not be taken including:
   a. expiration date has passed
   b. medication allergies
   c. prescriptions belonging to someone else
   d. appearance of warning signs of complications

6. To identify what steps should be taken if a medicine is not taken as prescribed (such as inability to take medicine due to nausea and/or vomiting).

7. To identify information which will be useful in obtaining a refill of prescribed medication including:
   a. how to find out if a refill is included in prescription
   b. obtaining refill before prescription runs out
   c. returning to same pharmacy
   d. taking prescription container to pharmacy

8. To identify several reliable sources for obtaining information about medications such as pharmacist, physician, or nurse.

9. To demonstrate awareness that there can be undesirable actions between different drugs, foods and beverages which are ingested simultaneously, and to identify how these undesirable effects can be prevented.

10. To describe a workable plan for monitoring a medication regimen. (The learner will describe this plan orally in a follow up interview.)

11. To identify situations when other people would need to know about a medication which is being taken, and how this may be accomplished.

1. The patient will be able to identify by name the medication which he or she is taking, as well as the dose and appearance of it.

2. The patient will be able to identify the general purpose(s) of the medication being prescribed for him or her.

3. The patient will be able to identify the possible side effects and/or adverse reactions of the medications, as well as the consequences of not adhearing to the medication regimen.

4. The patient will be able to identify how and when the medication should be taken.

5. The patient will be able to choose appropriate actions to take if warning signs occur or if an alteration in the schedule/dose of a medication has occurred or may be necessary.

6. The patient will be able to identify changes in daily living which may aid in the implementation of the medication regimen.

Appendix G

Hospital Interview Schedule

Patient Profile Questionnaire

Hospital Interview Schedule

Identification Number _____ Diagnosis: Primary _____

Secondary _____

Trait Number	Variable
1	Date of birth _____ Age (at last birthday) _____
2	Sex: Male _____ Female _____
3	Present marital status (circle one) 1. Married: living with spouse 2. Married: not living with spouse 3. Divorced or legally separated 4. Widowed 5. Never married 6. Other (cohabitation) _____
4	Ethnic group (circle one) 1. Caucasian 2. Black 3. Mexican-American 4. American Indian 5. Other (identify) _____
5	Highest grade of school completed (circle one) 1 2 3 4 5 6 7 8 9 10 11 12* College: 13 14 15 16* Postgraduate: 17+ Highest degree attained:* _____ *If 10-12 are circled, note if high school graduate If 13-16 are circled, note if any type of degree was awarded (such as Associate degree/Baccalaureate)
6	Occupation-Employment Status A. Please classify the patient's usual occupation (circle one) 1. Professional 2. Manager or owner of business 3. Farmer (owner or manager of at least 100 acres) 4. Clerical, sales, technician 5. Skilled craftsman, foreman 6. Operative, semi-skilled 7. Service worker 8. Unskilled 9. Farm labor (owner of less than 100 acres) 10. Housewife

B. Probes to be used to correctly classify work (add other information the patient may give). Ask patient.

1. What is the title of your position? _____
2. State the general duties of the job. _____
3. What is the name of the company? _____
4. What is the approximate size of the company? _____ (number of employees)

C. Employment status: (circle one and write in)

1. Employed (employed before illness and plans to return)
   Full time _____
   Part time _____ Hours per week _____
2. Unemployed _____
3. Unemployed and looking for work _____
4. Retired _____ How long? _____

D. How important is it to you or your family for you to be gainfully employed? (circle one)

1. Critical
2. Very important
3. Important
4. Not important

E. (If patient was housewife before illness) did you manage household tasks? (circle one)

1. Most of household tasks
2. Only some of household tasks
3. None of household tasks

F. Ask patient to try to estimate his/her total income (including spouse's income, if any) from all sources for the past 12 months. (circle one)

1. $50,000 or more
2. $25,000 to $49,999
3. $15,000 to $24,999
4. $12,000 to $14,999
5. $10,000 to $11,999
6. $ 9,000 to $ 9,999
7. $ 8,000 to $ 8,999
8. $ 7,000 to $ 7,999
9. $ 6,000 to $ 6,999
10. $ 5,000 to $ 5,999
11. $ 4,000 to $ 4,999
12. $ 3,500 to $ 3,999
13. $ 3,000 to $ 3,499
14. $ 2,500 to $ 2,999
15. $ 2,000 to $ 2,499
16. $ 1,500 to $ 1,999
17. $ 1,000 to $ 1,499
18. Less than $1,000

7 Living arrangements

A. Do you live alone?

1. Yes _____
2. No _____

B. Do you have anyone who will be concerned about your following the medical regimen? (circle one)

1. Yes
2. Probably Yes
3. Probably No
4. No
5. I don't know.

C. Will some other person (besides yourself) be involved in helping you follow the medical regimen? (within the next 3 months)
1. Yes - considerably
2. Yes - to some extent
3. No - probably not
4. No
5. I don't know

Probe to C if 1 or 2 is circled
With what aspects of the medical regimen will the other person be involved? (circle all that apply)
1. Diet
2. Medication
3. Exercise
4. Physical care (bathing)
5. Other _____

8 Payment for health care
A. Who will pay for your prescribed medications when you leave the hospital?

1. Patient pays in full ↓
2. Patient pays in part (includes insurance coverage) ↓
3. Another source pays (i.e., individual, governmental/ private agency/ insurance) ↓
4. Don't know. ↓

A. Does the patient consider medications as expensive?
1. Yes ↓ 2. No

A. Will it be:
1. not a problem
2. a problem, but will manage
3. a problem and will have to consider if they are worth the expense
4. a problem and not able or willing to buy them
5. Don't know.

B. Do you believe that your financial resources are <u>adequate</u> to cover the cost of your health care? (circle one)
1. Yes (adequate)
2. No (inadequate)

C. Do you believe that your financial resources are adequate to cover living expenses during recovery period? (circle one)
1. Yes (adequate)
2. No (inadequate)

9 Length of Illness (as defined by the patient)

A. The date when you were aware of having symptoms of poor health (i.e., aware of having a health problem).
Write in the approximate date _____

B. The date when you made changes in living routine because of symptoms
Write in the approximate date _____

C. What change in your living routine was most significant? (circle one)
1. In dietary routine
2. In rest-sleep patterns
3. In taking medications
4. In frequent visits to doctor
5. Other _____
Explain _____

D. Interviewer calculates length of illness

Number of days _____, weeks _____, months _____

10 Length of time of treatment at present hospital
Interviewer calculates this
Number of days _____, weeks _____, months _____

Appendix H

Digit Span

(Wechsler, 1945)

ID # _____

MEMORY SCALES

Memory Scales includes two tests (1) Digit Span and (2) Associate Learning. These tests are administered orally to the subject - the subject does not see the contents of these pages. Administer the tests exactly as directed.

1. DIGIT SPAN

(a) Digits Forward

Directions: Start with Trial I of Series 3 for all subjects. Begin by saying, "I am going to say some numbers. Listen carefully, and when I am through say them after me."

In any series, if the subject repeats Trial I correctly, proceed to the next higher series. If the subject fails Trial I, give Trial II of the same series, then proceed to the next series if he passes. The second trial of a series is given only if the first trial is failed.

Discontinue: After failure on both trials of a given series.

Scoring: The score is the number of digits in the longest series repeated without error in Trial I or II -- Circle that number in right-hand column.

SERIES	Trial I	Trial II	SCORE
(3)	5-8-2	6-9-4	3
(4)	6-4-3-9	7-2-8-6	4
(5)	4-2-7-3-1	7-5-8-3-6	5
(6)	6-1-9-4-7-3	3-9-2-4-8-7	6
(7)	5-9-1-7-4-2-8	4-1-7-9-3-8-6	7
(8)	5-8-1-9-2-6-4-7	3-8-2-9-5-1-7-4	8
(9)	2-7-5-8-6-2-5-8-4	7-1-3-9-4-2-5-6-8	9

(b) Digits Backward

Directions: Introduce this test by saying, "Now I am going to say some more numbers, but this time when I stop I want you to say them backwards. For example, if I say "7-1-9" what would you say?"

If the subject responds correctly, say "Here are some others" and proceed with the test beginning with Trial I of the 3-digit series.

If the subject does not reply correctly or fails to understand, give the right answer and another example, saying, "Remember you are to say them backwards: 3-4-8." If the subject succeeds this time, proceed with the test using Trial I of the 3-digit Series. However, if he fails the second example, proceed with the test by giving Trial I of the 2-digit Series. If a subject passes an example, but fails both trials of the 3-digit Series, go back and give the 2-digit Series, then discontinue the test.

Discontinue: After failure on both trials of a given series.

Scoring: The score is the number of digits in the longest series repeated backwards without error in Trial I or II -- Circle that number in right-hand column.

SERIES	Trial I	Trial II	SCORE
(2)	2-4	5-8	2
(3)	6-2-9	4-1-5	3
(4)	3-2-7-9	4-9-6-8	4
(5)	1-5-2-8-6	6-1-8-4-3	5
(6)	5-3-9-4-1-8	7-2-4-8-5-6	6
(7)	8-1-2-9-3-6-5	4-7-3-9-1-2-8	7
(8)	9-4-3-7-6-2-5-8	7-2-8-1-9-6-5-3	8

To calculate total score on Digit Span: Add the score for (a) and (b)

Digits Forward = _____

Digits Backward = _____

Total DIGIT SPAN SCORE = _____

Total score must be 8 or more in order for patient to be included in this study.

Apendix I

Associate Learning

(Wechsler, 1945)

2. ASSOCIATE LEARNING

Say, "I am going to read to you a list of words, 2 at a time. Listen carefully because after I am through I shall expect you to remember the words that go together. For example, if the words were EAST-WEST; GOLD-SILVER; then when I say the word EAST, I would expect you to answer (pause) WEST. And when I said the word GOLD you would, of course answer (pause) SILVER. Do you understand?"

When patient is clear, as to directions continue as follows: "Now listen carefully to the list as I read it." Read first presentation -- METAL-IRON, BABY-CRIES, etc. at the rate of 1 pair every 2 seconds.

First Presentation

Metal - Iron
Baby - Cries
Crush - Dark
North - South
School - Grocery
Rose - Flower
Up - Down
Obey - Inch
Fruit - Apple
Cabbage - Pen

After reading the first presentation allow 5 seconds and test by presenting first recall list. Give first word of pair and allow a maximum of 5 seconds for response. If patient gives correct reply, say, "That's right," and proceed with the next pair. If patient gives incorrect reply, say, "No" supply the correct association, and proceed with the following words.

First Recall	(Answers for Tester)* + = correct response 0 = incorrect response		SCORE (Correct items = +)	
North	(South)	_____	0.5	_____
Fruit	(Apple)	_____	0.5	_____
Obey	(Inch)	_____	1.0	_____
Rose	(Flower)	_____	0.5	_____
Baby	(Cries)	_____	0.5	_____
Up	(Down)	_____	0.5	_____
Cabbage	(Pen)	_____	1.0	_____
Metal	(Iron)	_____	0.5	_____
School	(Grocery)	_____	1.0	_____
Crush	(Dark)	_____	1.0	_____
			First Recall Score	_____

*Give credit only if subject gives correct response within 5 seconds.

ID # _____

After the first recall has been completed allow a 10-second interval and give second presentation list proceeding as before.

Second Presentation

Rose - Flower
Obey - Inch
North - South
Cabbage - Pen
Up - Down
Fruit - Apple
School - Grocery
Metal - Iron
Crush - Dark
Baby - Cries

Second Recall	(Answers for Tester)* + = correct response 0 = incorrect response		SCORE (Correct items +)	
Cabbage	(Pen)	_____	1.0	_____
Baby	(Cries)	_____	0.5	_____
Metal	(Iron)	_____	0.5	_____
School	(Grocery)	_____	1.0	_____
Up	(Down)	_____	0.5	_____
Rose	(Flower)	_____	0.5	_____
Obey	(Inch)	_____	1.0	_____
Fruit	(Apple)	_____	0.5	_____
Crush	(Dark)	_____	1.0	_____
North	(South)	_____	0.5	_____
		Second Recall Score		_____

Third Presentation

Baby - Cries
Obey - Inch
North - South
School - Grocery
Rose - Flower
Cabbage - Pen
Up - Down
Fruit - Apple
Crush - Dark
Metal - Iron

Third Recall	(Answers for Tester)* + = correct response 0 = incorrect response		SCORE (Correct items +)	
Obey	(Inch)	_____	1.0	_____
Fruit	(Apple)	_____	0.5	_____
Baby	(Cries)	_____	0.5	_____
Metal	(Iron)	_____	0.5	_____
Crush	(Dark)	_____	1.0	_____
School	(Grocery)	_____	1.0	_____
Rose	(Flower)	_____	0.5	_____
North	(South)	_____	0.5	_____
Cabbage	(Pen)	_____	1.0	_____
Up	(Down)	_____	0.5	_____
		Third Recall Score		_____

SCORING:
First Recall Score _____
Second Recall Score _____
Third Recall Score _____
TOTAL

Total score must be 8 or more in order for patient to be included in this study.

Apendix J

Multidimensional Health Locus of Control Scale

(Wallston, Wallston & DeVellis, 1978)

Multidimensional Health Locus of Control

(MHLC)

This is a questionnaire designed to determine the way in which different people view certain important health-related issues. Each item is a belief statement with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree (1) to strongly agree (6). For each item we would like you to circle the number that represents the extent to which you disagree or agree with the statement. The more strongly you agree with a statement, then the higher will be the number you circle. The more strongly you disagree with a statement, then the lower will be the number you circle. Please make sure that you answer every item and that you circle only one number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

Please answer these items carefully, but do not spend too much time on any one item. As much as you can, try to respond to each item independently. When making your choice, do not be influenced by your previous choices. It is important that you respond according to your actual beliefs and not according to how you feel you should believe or how you think we want you to believe.

Strongly Disagree - 1
Moderately Disagree - 2
Slightly Disagree - 3
Slightly Agree - 4
Moderately Agree - 5
Strongly Agree - 6

1.	If I get sick, it is my own behavior which determines how soon I get well again.	1 2 3 4 5 6
2.	No matter what I do, if I am going to get sick, I will get sick.	1 2 3 4 5 6
3.	Having regular contact with my physician is the best way for me to avoid illness.	1 2 3 4 5 6
4.	Most things that affect my health happen to me by accident.	1 2 3 4 5 6
5.	Whenever I don't feel well, I should consult a medically trained professional.	1 2 3 4 5 6
6.	I am in control of my health.	1 2 3 4 5 6
7.	My family has a lot to do with my becoming sick or staying healthy.	1 2 3 4 5 6
8.	When I get sick I am to blame.	1 2 3 4 5 6

Strongly Disagree - 1
Moderately Disagree - 2
Slightly Disagree - 3
Slightly Agree - 4
Moderately Agree - 5
Strongly Agree - 6

9.	Luck plays a big part in determining how soon I will recover from an illness.	1	2	3	4	5	6
10.	Health professionals control my health.	1	2	3	4	5	6
11.	My good health is largely a matter of good fortune.	1	2	3	4	5	6
12.	The main thing which affects my health is what I myself do.	1	2	3	4	5	6
13.	If I take care of myself, I can avoid illness.	1	2	3	4	5	6
14.	When I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.	1	2	3	4	5	6
15.	No matter what I do, I'm likely to get sick.	1	2	3	4	5	6
16.	If it's meant to be, I will stay healthy.	1	2	3	4	5	6
17.	If I take the right actions, I can stay healthy.	1	2	3	4	5	6
18.	Regarding my health, I can only do what my doctor tells me to do.	1	2	3	4	5	6

Appendix K

Medication Safety Knowledge Test Form

ID # _____

MEDICATION SAFETY

Instructions: Please mark in the space provided the most correct response for each statement by selecting one of the 5 alternatives (a, b, c, d or e).

_____ 1. Refill means that
- a. you are allowed as much medication as you feel is necessary.
- b. your prescription will be given again as ordered by your doctor.
- c. with every prescription, you will receive a different medication.
- d. the pharmacist is legally responsible to repeat each prescription as many times as he feels is necessary.
- e. I don't know.

_____ 2. When pouring liquid medications you should pour away from the label because
- a. you can see the color of the medication.
- b. you can prevent spillage on the label.
- c. you have a better grip on the container.
- d. you can pour the exact amount more accurately.
- e. I don't know.

_____ 3. Three of the following habits would help you to store your medications safely, and prevent accidents. Which habit is a poor one?
- a. Keep the medication in a dry place.
- b. Keep different medicines in different containers.
- c. Keep the medications in unlabeled containers.
- d. Keep the medication away from small children.
- e. I don't know.

_____ 4. Writing down exactly when you took your medication helps you by
- a. totaling the number of pills in the container.
- b. decreasing the chance of repeating a dose.
- c. keeping insurance records correct.
- d. complying with safety practices which are prescribed by law.
- e. I don't know.

_____ 5. When should a person stop taking his or her medication as usual and call their physician?
- a. When the person is feeling better.
- b. When the person is taking other medications for a cold.
- c. Before going to the dentist.
- d. When the person notices warning signs.
- e. I don't know.

_____ 6. If you forget a dose of medication, you should
- a. take double the amount the next time.
- b. take ½ your dose when you remember.
- c. take the usual dose the next time.
- d. call your physician.
- e. I don't know.

_____ 7. If you are taking medication regularly and run out, you should
- a. substitute another medication.
- b. borrow from a friend.
- c. stop taking the medication.
- d. refill the prescription.
- e. I don't know.

_____ 8. Additional reliable information on your medications can be obtained from
   a. your dentist.
   b. a pharmacist.
   c. teacher at a nearby school.
   d. a current health magazine.
   e. I don't know.

_____ 9. Many applications such as those for driver's licenses and work permits require you be honest about the medications you are taking because
   a. employers do not like to hire people with illnesses requiring medication .
   b. you are not to drive while taking prescription drugs.
   c. employers want to make sure you are not an addict.
   d. of the concern for your safety.
   e. I don't know.

_____ 10. Which of the following should be included in a daily record of your medication?
   a. time, medication, expiration date, dose.
   b. date, time, physician's phone number, medication.
   c. dose, medication, date and time.
   d. time, dose, expiration date and pharmacist's number.
   e. I don't know.

_____ 11. One purpose of a medic-alert bracelet is to
   a. remind you to take the correct dose of your medication at certain times.
   b. let your co-workers know about the medication you are taking.
   c. warn people when you are unable to communicate about what medications you take.
   d. show the pharmacist when getting a refill.
   e. I don't know.

Appendix L

Cardiac Medication Knowledge Test Form

CARDIAC MEDICATION

Instructions: Please mark in the space provided the most correct response for each statement by selecting one of the 5 alternatives (a, b, c, d or e).

_____ 1. Sometimes a person may not be getting enough digoxin. Three of the following signs would alert you to this problem. Which sign does not belong?
   a. increased thirst
   b. shortness of breath
   c. unexplained weight gain
   d. swelling in your feet and legs
   e. I don't know.

_____ 2. Sometimes a person can be getting too much digoxin. Three of the following signs would alert you to this problem. Which sign does not belong?
   a. blurred vision
   b. 6 pound weight gain
   c. unusual weakness or tiredness
   d. pulse has 9 skipped beats
   e. I don't know.

_____ 3. What is the dose of digoxin you are taking?
   a. 0.125 mg.
   b. 0.250 mg.
   c. 0.500 mg.
   d. 0.375 mg.
   e. I don't know.

_____ 4. Your pulse rate is 44 beats per minute, you will
   a. take your digoxin as prescribed.
   b. ask the doctor before taking your digoxin.
   c. take 2 digoxin pills.
   d. take ½ the dose of digoxin.
   e. I don't know.

_____ 5. You have to have a tooth removed. On the day of your appointment you,
   a. omit your digoxin and tell the dentist.
   b. take two pills instead of one.
   c. take your digoxin and tell the dentist.
   d. omit the digoxin and record the fact.
   e. I don't know.

_____ 6. In taking your ordered dose of digoxin, you should take it
   a. when you feel ill.
   b. at a regular time daily.
   c. at night.
   d. at any time daily.
   e. I don't know.

_____ 7. What is one reason for taking digoxin?
   a. regulates the heart rate
   b. increases the heart rate
   c. creates an improved pulse
   d. relieves heart pain
   e. I don't know.

_____ 8. Too little digoxin may cause
   a. an increased pulse rate of 90 beats.
   b. a decreased pulse rate of 50 beats.
   c. sudden gain of 6 pounds.
   d. sudden loss of 6 pounds.
   e. I don't know.

_____ 9. Too much digoxin may cause
   a. a stomach ache.
   b. hunger and thirst.
   c. pulse of 60.
   d. nausea or vomiting.
   e. I don't know.

_____ 10. If your pulse is not within the normal limits, you should <u>first</u>
   a. take digoxin as usual.
   b. not take digoxin.
   c. check pulse again in a half hour.
   d. call your doctor.
   e. I don't know.

_____ 11. What color or colors of digoxin pills are you taking? (Check more than one if more than one digoxin pill is being taken.)
   a. white
   b. yellow
   c. pink
   d. green
   e. I don't know.

_____ 12. Which <u>one</u> of the following statements is <u>false</u>?
   a. Digoxin is a strong medication.
   b. Taking Digoxin with a meal helps you to remember to take it.
   c. The amount of digoxin one needs can be determined by how a person feels
   d. Digoxin helps to increase the pumping force of the heart.
   e. I don't know.

_____ 13. What will you do if you have another health problem; for example, a cold, sore throat or other infection?
   a. Stop taking digoxin until cold resolves.
   b. Contact the doctor who prescribed the digoxin.
   c. Begin taking over-the-counter medications.
   d. Stop taking all medications and call your doctor or clinic.
   e. I don't know.

_____ 14. If your pulse is less than 55 beats a minute, one of the things you should do is
   a. take one half of the dose of digoxin.
   b. take double the dose of digoxin.
   c. not take your digoxin and call the doctor.
   d. take your digoxin as usual and call the doctor.
   e. I don't know.

_____ 15. The main purpose of keeping a daily medication record is
- a. to know in advance when your medication runs out.
- b. to know when your next appointment will be.
- c. to help you remember to take your medication.
- d. to inform your doctor of how you take your medication.
- e. I don't know.

_____ 16. When taking digoxin, be sure to place a check under the date on your medication record
- a. prior to taking your digoxin.
- b. after taking your digoxin.
- c. some time during the day.
- d. that evening.
- e. I don't know.

_____ 17. A reason for taking digoxin is to
- a. relieve heart pain.
- b. make the heart pump better.
- c. calm your heart and help you sleep better.
- d. maintain the chemical balance for normal activity of the heart.
- e. I don't know.

_____ 18. The color of your digoxin may differ due to the
- a. different strengths or dosages.
- b. bottle it is stored in.
- c. state you live in.
- d. pharmacy from which you purchase it.
- e. I don't know.

_____ 19. Compared to other medication such as aspirin, digoxin is
- a. a large tablet.
- b. a tiny pill.
- c. a capsule.
- d. a liquid.
- e. I don't know.

_____ 20. How should you regularly take your digoxin?
- a. with a meal
- b. by itself
- c. with an antacid
- d. when you remember
- e. I don't know.

Appendix M

Replacement Medication Knowledge Test Form

Instructions: Please mark in the space provided the most correct response for each statement by selecting one of the 5 alternatives (a, b, c, d or e).

_____ 1. What is the form of Potassium Chloride you are taking?
- a. liquid
- b. capsule
- c. tablet
- d. powder
- e. I don't know.

_____ 2. Potassium chloride is also written chemically as
- a. M.D.
- b. NaCl
- c. MGB
- d. KCl
- e. I don't know.

_____ 3. What dose of Potassium Chloride is prescribed for you?
- a. 8 milliequivalents (mEq)
- b. 15 milliequivalents (mEq)
- c. 20 milliequivalents (mEq)
- d. 25 milliequivalents (mEq) or _____ (fill in blank)
- e. I don't know.

_____ 4. Potassium Chloride is taken
- a. to ensure muscular energy while exercising.
- b. to help relieve a cough during a cold.
- c. to replace chemicals lost when taking a diuretic.
- d. to maximize the utilization of other vitamins.
- e. I don't know.

_____ 5. Potassium Chloride is taken
- a. to supplement a loss in sodium when taking a diuretic.
- b. for proper nerve, muscle and heart function.
- c. to increase protein content in a diet.
- d. for adequate glucose content in a diet.
- e. I don't know.

_____ 6. A sign that your doctor needs to change your Potassium Chloride dose is
- a. craving for something sweet.
- b. hunger after skipping breakfast.
- c. feeling weakness, tingling or numbness in your legs.
- d. a pulse rate more than 55 per minute and less than 110 per minute.
- e. I don't know.

_____ 7. Potassium Chloride loss may cause which of the following?
- a. water retention and hypersensitivity
- b. vomiting and muscle cramps
- c. increased muscle function
- d. increased appetite
- e. I don't know.

____ 8. Potassium Chloride is usually prescribed when
   a. a diuretic is being taken.
   b. nitroglycerin is taken.
   c. aspirin is administered.
   d. vitamins are prescribed.
   e. I don't know.

____ 9. Potassium Chloride is usually mixed with
   a. milk
   b. coffee.
   c. water or juice.
   d. your meal.
   e. I don't know.

____ 10. The best time to take Potassium Chloride is
   a. at a meal.
   b. between lunch and dinner.
   c. before retiring at night.
   d. two hours after any meal.
   e. I don't know.

____ 11. Your prescription states "Take Potassium Chloride (8 mEq) 1 tablet 3 times a day." How many Potassium Chloride tablets do you take daily?
   a. 8 tablets
   b. 1 tablet
   c. 24 tablets
   d. 3 tablets
   e. I don't know.

____ 12. After taking Potassium Chloride for a time you feel woozy, lightheaded and listless. You should
   a. stay in bed when you feel this way.
   b. accept this kind of feeling.
   c. limit your activities.
   d. inform your doctor.
   e. I don't know.

____ 13. You may need a change in your dose of Potassium Chloride when you
   a. feel rapid heartbeats and nausea.
   b. cough and sneeze.
   c. feel better.
   d. have lost the excess weight.
   e. I don't know.

____ 14. Keeping a daily record of your Potassium Chloride includes a checklist with
   a. the color and amount of Potassium Chloride.
   b. the time and date taken.
   c. the date when your prescription runs out.
   d. the brand of Potassium Chloride.
   e. I don't know.

____ 15. Take your potassium chloride
   a. when you remember.
   b. when you have leg muscle cramps.
   c. mixed with milk.
   d. regularly.
   e. I don't know.

Appendix N

Diuretic Medication Knowledge Test Form

ID # _____

DIURETIC MEDICATIONS

Instructions: Please mark in the space provided the most correct response for each statement by selecting one of the 5 alternatives (a, b, c, d or e).

_____ 1. One reason for taking your diuretic is that it
- a. decreases body potassium.
- b. helps remove excess sodium.
- c. helps you lose weight.
- d. regulates the heart beat.
- e. I don't know.

_____ 2. If you should experience a warning sign indicating too much diuretic, you will
- a. not take the diuretic and call your doctor.
- b. take the prescribed dose and note any change.
- c. take ½ the prescribed dose of the diuretic and note any change.
- d. stop taking your diuretic.
- e. I don't know.

_____ 3. "Diuretics" is a term used to classify
- a. supplements.
- b. "water pills".
- c. Lasix.
- d. heart medications.
- e. I don't know.

_____ 4. You have been feeling very lightheaded and woozy when you stand up. What should you do?
- a. Sit down for awhile.
- b. Drink more water.
- c. Discuss this with your doctor.
- d. Go for a walk to clear your head.
- e. I don't know.

_____ 5. Keeping a record of your diuretic includes a checklist with the time and amount and
- a. the color of the potassium chloride.
- b. the date taken and not taken.
- c. date when your prescription runs out.
- d. all effects of the medication.
- e. I don't know.

_____ 6. What is the dose of diuretic you are taking?
- a. 20 milligrams
- b. 40 milligrams
- c. 50 milligrams
- d. other _____(fill in dose)
- e. I don't know.

_____ 7. The color of the diuretic you take is
- a. pink
- b. white
- c. yellow
- d. blue
- e. I don't know.

_____ 8. Which are diuretics?
   a. Digoxin and Lanoxin
   b. Potassium Chloride and Sodium Chloride
   c. Nitroglycerin and Propranolol
   d. Furosemide and Hydrochlorothiazide
   e. I don't know.

_____ 9. You will take your diuretic as long as
   a. your medication lasts.
   b. you have ankle swelling.
   c. you feel ill.
   d. your doctor tells you to.
   e. I don't know.

_____ 10. A major action of a diuretic is to
   a. increase the work of the heart.
   b. remove extra potassium from the body.
   c. decrease the body fluids.
   d. maintain the balance of body potassium.
   e. I don't know.

_____ 11. If you take more of the diuretic than prescribed, you may
   a. decrease your pulse rate.
   b. gain 4 pounds in two days.
   c. keep too much body potassium.
   d. lose too much salt.
   e. I don't know.

_____ 12. When a person is taking a diuretic it may become necessary for him/her to also
   a. take a sodium chloride replacement.
   b. eat foods high in potassium.
   c. take a high potency vitamin.
   d. check the heart beat daily.
   e. I don't know.

_____ 13. You will know when each dose is to be taken by
   a. relying on your memory.
   b. calling your pharmacist.
   c. reading the label.
   d. calling your doctor.
   e. I don't know.

_____ 14. A time of day you usually take one dose of your diuretic is
   a. in the morning.
   b. any convenient time.
   c. in the evening.
   d. before going to sleep.
   e. I don't know.

_____ 15. When weighing yourself it is best to
   a. use the doctor's scale at every visit.
   b. weigh twice a day.
   c. weigh on your scale each day.
   d. purchase a balance scale.
   e. I don't know.

Appendix O

Teacher's Data Sheet

ID# _____

TEACHER'S DATA SHEET

Please fill out one form per patient. Be sure to return with testing material.

1. Strategy used: (circle one)

   Strategy 1

   Strategy 2

   Strategy 3

   Length of time of each instruction:

   1. _____ minutes

   2. _____ minutes

2. Please record information and initial impressions about response of patient to the strategy used (e.g., appeared responsive to the approach; seemed reticent in behavior; tried to change approach, such as frequent interruption of lecture, etc.)

3. Questions asked by patient and teacher's response to questions.

AN ABSTRACT OF THE CLINICAL INVESTIGATION OF

DENISE SAMPLE DEMARAY

For the MASTER OF NURSING

Date of Receiving this Degree: June 10, 1983

Title: LEARNER CONTROL AS A PATIENT TEACHING VARIABLE WITH PERSONS TAKING CARDIAC MEDICATIONS

Approved: _____
May Rawlinson, Ph.D., Professor, Thesis Advisor

Hospitalized persons with chronic cardiac illness frequently need instruction about their prescribed medications in order to manage their medication regimen when they return home. The nursing profession accepts patient teaching as a nursing-care responsibility; however, information is not available for nurses to know the most effective way of giving this instruction.

The purpose of this study was to determine the most effective method to teach self-administered prescribed medications to hospitalized chronically-ill persons with cardiac conditions in terms of outcomes related to knowledge acquisition and retention. Thirty-two hospitalized cardiac patients between the ages of 45 and 82 who met the criteria for selection from three hospitals were included in the study. Within each hospital, the subjects were randomly assigned to four teaching

treatments and closely matched for drug difficulty, length of illness, and memory function. These procedures were effective in controlling selected attributes of the subjects which could affect the learning outcomes. The groups were found to be comparable on selected demographic, illness and personality variables.

An experimental pre- and posttest with control group design was used. The three teaching treatments were ordered along a continuum of learner control of the content and process of instruction. The teaching treatments consisted of: Strategy 1, the lecture method which allotted a low degree of learner control; Strategy 2, the decision-making method which allowed a medium degree of learner control; and Strategy 3, the self-directed method which allotted a high degree of learner control. The additional treatment group, Strategy 4, consisted of subjects who received routine care and served as a control group. Each teaching treatment consisted of similar content based on teaching objectives for safety and two of three specified medications, digoxin, diuretic, and potassium replacement. The dependent variable was measured by the use of three alternate forms of knowledge tests for each of the two medications and safety which were administered in random order before teaching (pretest), one day after teaching (posttest 1), and approximately two weeks after hospital discharge (posttest 2). The control group was tested in the same sequence as the teaching groups.

Four hypotheses were tested. Hypothesis I stated: There will be a significant increase in knowledge acquisition among the three patient-teaching groups compared to the no-teaching control group. By analysis of covariance (ANCOVA) with the pretest as a covariate, it was shown

that the posttest 1 knowledge scores of the teaching groups were significantly greater than those of the control group. Therefore, hypothesis I was accepted. Hypothesis II stated: Persons in the decision-making group will show a significant increase in knowledge acquisition over the other two patient-teaching groups. A posteriori comparison, Tukey's test, resulted in no significant differences in knowledge acquisition among the three groups. Therefore, hypothesis II was rejected. Hypothesis III stated: There will be a significant increase in knowledge retention among the three patient-teaching groups compared to the no-teaching control group. The ANCOVA with the pretest as a covariate resulted in no significant differences among the four groups on posttest 2 scores. Therefore hypothesis III was rejected. Hypothesis IV stated: The decision-making group will show a significant increase in knowledge retention over the other two patient-teaching groups. Due to the overall nonsignificant differences among the four groups in knowledge retention by ANCOVA, hypothesis IV was rejected. Of interest in these findings is the fact that the three teaching groups maintained their knowledge gains from posttest 1 to posttest 2. However, no significant differences were found on posttest 2 between the teaching and no-teaching groups as the control group had gained appreciably in knowledge between the two posttests. It is probable that test sensitization contributed to these increases by the control group. Conclusions were drawn and recommendations were made.