

NURSES' KNOWLEDGE OF CARDIOVASCULAR
DIAGNOSTIC PROCEDURES

A THESIS
SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF SCIENCE
IN THE GRADUATE SCHOOL OF THE
TEXAS WOMAN'S UNIVERSITY

COLLEGE OF NURSING

BY
ELIZABETH LEE SOUTHER, B.S.N.

DENTON, TEXAS

DECEMBER 1982

ACKNOWLEDGMENTS

I wish to express my gratitude to my major advisor, Dr. Donna Vokaty, for her guidance and support. Appreciation is expressed to Dr. Elizabeth Anderson for her suggestions and encouragement. Additionally, Dr. Carolyn Adamson is greatly appreciated for her personalized statistics course.

The nurses of St. Luke's Hospital have my warm appreciation for their support and encouragement. Thank you, Mary Ellen Deeves, MSN, for allowing me to replicate your study and giving me special consideration. Elaine Brannan, RN, Fran Price, RN, Jackie Johnson, RN, Janet Duncan, RN, and Sybil Shoemaker, RN, thank you for your understanding and interest.

Special thanks goes to Rosa Lee Bachtel for her counseling and typing skills. Her special skills made this endeavor complete.

Of those closest to me, I wish to acknowledge my parents for their persistence and love. And to Doug Shember for his many hours of support and long hours of waiting while the effort for this thesis was made, a very sincere thank you.

TABLE OF CONTENTS

ACKNOWLEDGMENTS	iii
LIST OF TABLES	vi
CHAPTER	
1. INTRODUCTION	1
Problem of Study	2
Justification of Problem	2
Conceptual Framework	3
Research Questions	5
Definition of Terms	5
Limitations	6
Summary	7
2. REVIEW OF THE LITERATURE	8
Nurses' Failure to Fulfill the	
Teaching Role	8
Stress and the Patient	14
Preparing the Cardiac Patient for Invasive	
Procedures	20
Summary	25
3. PROCEDURE FOR COLLECTION AND TREATMENT OF DATA .	26
Setting	26
Population and Sample	26
Protection of Human Subjects	27
Instruments	27
Data Collection	28
Treatment of Data	28
Summary	29
4. ANALYSIS OF DATA	30
Description of Sample	30
Findings	34
Summary of Findings	40

CHAPTER

5. SUMMARY OF THE STUDY	42
Summary	42
Conclusions and Implications	44
Recommendations	46
APPENDIX A: AGENCY PERMISSION	47
APPENDIX B: QUESTIONNAIRE PACKET	49
REFERENCES	59

LIST OF TABLES

Table

1. Shift Assignment and Age Distribution of 31
Registered Nurses from Cardiovascular
Nursing Units in Knowledge Level Study 31
2. Educational Preparation of 31 Registered
Nurses from Cardiovascular Nursing Units
in Knowledge Level Study 32
3. Length of Time Practicing Nursing of 31
Registered Nurses from Cardiovascular
Nursing Units in Knowledge Level Study 33

CHAPTER 1

INTRODUCTION

Rapid advancement in biomedical knowledge and technology has provided humans with the ability to accomplish sophisticated cardiovascular diagnostic procedures. These procedures are both invasive and noninvasive in nature.

To cardiac patients, the thought of undergoing a diagnostic procedure is anxiety producing. They have thoughts, feelings and questions concerning their well-being. Brambilla (1969) has addressed the problem of anxiety in cardiac patients and identified information giving as an anxiety alleviating procedure. Therefore, information must be provided to patients in order to alleviate or reduce their anxiety level.

Nurses have the greatest opportunity for providing necessary information to patients (Murdaugh, 1980) and as suggested by Graham and Gleir (1980), "health teaching or health education is considered one of the most important functions of the professional nurse" (p. 4). However, many nurses fail to accomplish this role. Syred (1981) stated that "the nurses' own education has failed to equip her with the skills necessary for the fulfillment of this

role" (p. 27). In addition, Murdaugh (1980) stated that nurses lack the knowledge necessary to teach. It is not possible for nurses to teach a subject which they do not fully understand. Therefore, it was the purpose of this study to investigate the level of knowledge nurses have of cardiac diagnostic procedures.

Problem of Study

Because of the technological explosion in cardiovascular diagnostics and the suggestion that nurses lack the knowledge to teach patients, the question addressed in this study was: Do registered nurses practicing in a cardiovascular area have adequate knowledge of invasive and noninvasive cardiovascular diagnostic procedures?

Justification of Problem

It has been documented in the literature (Brambilla, 1969; del Bueno, 1978; Murdaugh, 1980) that one of the most important roles for the nurse is the teaching role, a role that is poorly fulfilled. Lack of specific knowledge has been cited frequently as one reason for nurses not teaching. However, there was little empirical evidence that nurses lack knowledge. Therefore, the thrust of this study was to determine the knowledge level relative to cardiovascular diagnostic procedures of nurses caring for cardiovascular

patients. Substantiation of lack of knowledge through accepted research methods would perhaps provide the necessary impetus to develop programs to assist nurses in this area.

Conceptual Framework

Brameld (1950) stated that "knowledge can be viewed as a kind of reservoir of information, facts, laws, habits, principles and processes that each person accumulates as he lives through the interworking of experience" (p. 166). Knowledge includes understanding and comprehension, and it leads humans to seek new dimension to their life experience.

According to Webster's (1967) scientific knowledge refers to a systematized body of facts and principles which is learned. Scientific knowledge is specialized knowledge. It is a body of information to which many individuals have contributed. A professional in the scientific community must demonstrate an understanding of theoretical aspects of a specific body of knowledge. However, the specialized knowledge is not common to most individuals and is learned through the teaching process.

Teaching involves shaping behaviors and beliefs and transmitting knowledge (Green, 1971). The transfer of knowledge between two individuals implies teaching by one individual and learning by the other.

The work of teaching is to produce and to prevent changes in human beings; to preserve and increase the desirable qualities of body, intellect and character and to get rid of the undesirable. (Johnson, 1971, p. 15)

Teaching produces through learning, changes in behavior, beliefs, insights, perception and motivation (Bigge, 1971).

An adequate knowledge base is essential to teach. Historically, teachers have been viewed as scholars (Stone & Schneider, 1965). This implies a level of competency in a body of knowledge. Highet (1951) discussed the idea that teachers must know the subject and what they teach. Highet (1951) discussed knowledge and teaching, stating "one cannot understand even the rudiments of an important subject without knowing its higher levels" (p. 14). He concluded that essential to good teaching is an adequate knowledge base of the teacher.

Balassi (1968) discussed the kinds of knowledge which make a good teacher.

The effective teacher has at least five kinds of knowledge: general knowledge, knowledge of what he is to teach, professional knowledge, knowledge of the students he is to teach, and knowledge of himself. (p. 6)

This idea is applicable to the nurse-patient teaching situation. In this teaching situation the nurse must possess general knowledge, knowledge of what must be taught, professional knowledge of what is to be taught and how to teach it, knowledge of patients and their readiness to

learn, and understanding of her own strengths and weaknesses. The nurse has the special task of understanding a scientific body of knowledge and of teaching that knowledge to patients.

Research Questions

In this study the research questions were:

1. What level of knowledge does the cardiovascular registered nurse have of invasive and noninvasive diagnostic procedures?
2. Is there a difference between the knowledge cardiovascular registered nurses possess of invasive procedures, dynamic noninvasive procedures, and nondynamic noninvasive procedures?

Definition of Terms

The following terms were defined for this study:

1. Cardiac patient: any individual hospitalized for the diagnosis and treatment of physiological symptoms arising from the heart.
2. Cardiovascular registered nurse: an individual licensed by the State of Texas to practice nursing and providing care for cardiovascular patients.
3. Dynamic noninvasive cardiovascular procedure: a cardiovascular diagnostic technique requiring the heart to be in a work state. Specifically these are the

treadmill or stress test, 24 hour Holter monitoring or continuous EKG monitoring, and stress testing in conjunction with radioisotope scanning.

4. Invasive cardiovascular procedure: a cardiac diagnostic procedure involving percutaneous entry into the body, i.e., cardiac catheterization.
5. Knowledge: a body of information of cardiovascular diagnostic techniques as measured by the Index of Nurses' Knowledge of Cardiac Diagnostic Procedures (Deeves, 1980).
6. Nondynamic noninvasive cardiovascular procedure: a cardiovascular diagnostic procedure requiring the patient to remain in a resting state, i.e., EKG, echophonocardiography, and radioisotope scanning in a resting state.
7. Noninvasive cardiovascular procedure: any cardiovascular procedure that does not involve surgical intervention. This included dynamic noninvasive and nondynamic noninvasive procedures.

Limitations

This study was conducted in one institution using a convenience sample. Therefore, the findings can only be generalized to the units sampled.

Summary

In order to fulfill the teaching role the nurse must possess an adequate knowledge level of cardiovascular diagnostic procedures. The purpose of this study was to determine if nurses have an adequate knowledge level of cardiovascular diagnostic procedures. Chapter 2 reviews the literature on the nurses' failure to teach, stress and the patient, and preparing the cardiac patient for invasive procedures. Chapter 3 discusses the procedure for the collection and treatment of data. Chapter 4 presents the analysis of the data. Chapter 5 summarizes the study and proposes conclusions, implications, and recommendations based on the results of this study.

CHAPTER 2

REVIEW OF THE LITERATURE

This study was undertaken to ascertain cardiovascular nurses' level of knowledge of invasive and noninvasive procedures. This review of literature contains three major areas. First, the failure of nurses to fulfill their teaching role is examined. Additionally, the literature on stress factors and the patient is explored. Thirdly, preparing the cardiac patient for invasive procedures is discussed.

Nurses' Failure to Fulfill the Teaching Role

Powell and Winslow (1973) stated that effective, consistent teaching is not being accomplished by nurses. They pointed out that both teaching and learning are difficult to accomplish in the hospital due to the variety of patient needs, abilities, ages, and disease processes. The authors stated that because it is difficult for the nurse to be knowledgeable about all the disease processes, tests, and procedures, the nurse may not be aware of the patient's learning needs. This may result in unfulfillment of the teaching role.

Winslow (1976) identified patient teaching as an essential nursing function, but stated that nurses are not providing effective teaching. Nurses are viewed by both patients and physicians as being incompetent patient educators. Winslow gathered information from the nursing literature on the reasons nurses gave for not teaching. Among those reasons found on the nursing unit are the nurses' lack of time due to their heavy workload, inadequate staffing, and lack of nursing service support. Additionally, Winslow (1976) stated that nurses themselves feel inadequately prepared to teach, lack the knowledge to teach, and feel that sharing knowledge with their patients decreases their power over the patient. Other reasons that Winslow offered for nurses not fulfilling their teaching role are poor communication between health team members, the physician not allowing the nurse to teach their patient, and the patient not requesting information.

Del Bueno (1978) stated that although patient education is the responsibility of the nursing staff, the nursing staff must accept the responsibility. The staff must believe patient education is as important as other nursing functions such as giving baths and medicines. Del Bueno acknowledged that teaching and its documentation in the chart is time consuming when time is scarce on a nursing

unit. Consequently, the nurse must be encouraged and supported by nursing administrators to set a priority for patient education. Additionally, the author stated that many physicians are opposed to patient education by nurses. She cited several physicians who believed that patient education programs should come only from the physician.

The role of the nurse in health education was discussed by Smith (1979). Smith pointed out that health education is part of the nursing process; therefore, increased involvement of nurses in health education is a logical extension of their role. Nurses are the largest group of health workers and their potential for influence on the patient is great. Smith noted that the 20th century has undergone an explosion in medical and scientific knowledge and nurses must accept the added responsibility this knowledge explosion places on patient education (Smith, 1979).

Graham and Gleir (1980) cited health teaching as one of the most important functions of the nurse. They answered a charge by Brennam, a professor of health education, that nurses are oriented to the care of the sick and are not specialists in the area of education and communication. Graham and Gleir, who did not refute the statement but explored the basis for it, concluded that nurses identify

the need for teaching but are not scholastically prepared to implement a teaching process.

How do nurses themselves view the patient teaching role? The nurse practitioner has a unique contribution to make in education in the health care system. According to Gibbs (1980), however, the nurse practitioner views the education role as a low priority within the total practice role. Gibbs further stated that nurses do not feel teaching is essential. She concluded that the teaching role is essential and should be integrated with the clinical role through adequately preparing the nurse to teach. Likewise, Syred (1981) discussed the abdication of the teaching role by nurses. He pointed out that nurses are in a unique position to provide health education but many fail to do so. Syred concluded the reason for not teaching is that the nurse's education has not provided her with the skills to teach.

Pohl (1965) noted that the nurse has an increased need to teach due to rapid increase of knowledge in the medical field. In an attempt to describe the nurse's teaching role, clarify the role, and determine the scope of the role, data were obtained from 2,000 nurses in five areas of nursing across the United States. The instrument used was a 20-item questionnaire in two forms. Topics included in the

questionnaire were teaching activities, concepts of teaching, opinions and attitudes about teaching activities, and factors that affect the respondent's teaching. The findings of the study indicated that there was confusion about the teaching role and a lack of preparation to teach. Pohl found that nurses were aware that the teaching role was one of their responsibilities, but they were not clear in their concept of teaching. The respondents reported difficulty in teaching certain kinds of topics, i.e., death and dying. Additionally, the respondents reported difficulty in teaching certain kinds of learners, i.e., the elderly. Nurses frequently mentioned lack of time, heavy workload, and understaffing as factors interfering with teaching.

Murdaugh (1980) conducted a study to determine if patients would learn more about their disease and therapeutic regimen if nurses were taught teaching-learning principles. A sample of 40 patients in coronary care units (CCUs) and 26 nurses working in the CCUs was used. The nurses were taught a six-session course on teaching-learning principles. The patients were tested to determine if knowledge about their disease had increased at the time of discharge compared to their knowledge at admission. The results indicated teaching was more effective when nurses were taught teaching-learning principles.

Murdaugh (1980) also examined the major obstacles to teaching; these included lack of time, patients not being ready to learn, and the nurses' lack of teaching skills. Six months after the study, the investigator submitted a questionnaire on "Beliefs About Patient Teaching" to the nurses who participated in the teaching-learning principles study. The nurses' most frequently cited obstacles to teaching were lack of time, lack of continuity in working with the same patient, and physician interference. The most significant finding in this study was that lack of teaching skill was not mentioned as an obstacle to teaching.

One study which supported the teaching role of nurses was conducted by Draye and Pesznecker (1980). This study was conducted to determine if nurses were able to integrate teaching in primary care settings. A group of 356 nurses providing primary care to ambulatory persons of all ages was selected. A 52-item nursing activity code sheet was the instrument used and nursing activities over a two-day period were documented. The results of the study indicated that teaching in the primary care area was the most common intervention used by the nurses.

Most of the studies concerned with the teaching role of the nurse demonstrate that nurses fail to fulfill their

teaching role. A variety of reasons nurses do not teach were cited in the studies. However, one study (Draye & Pesznecker, 1980) demonstrated that nurses do teach, but the nurse-patient setting was in a primary care area.

Stress and the Patient

Today's hospital is a frightening environment.

Patients undergoing diagnostic tests or surgery find the hospital particularly stressful. Patients are subjected to a multitude of people, tests, and procedures which are foreign. What is commonplace to the hospital worker may be stress producing to the patient (Powers, 1968).

Volicer and Bohannon (1975) examined the hospital setting as a stress-producer to the patient. They developed a rating scale to measure the psychosocial stress experienced by short term medical-surgical patients. Of 261 patients surveyed, those items related to lack of communication of information by the hospital staff were ranked highest on the stress scale.

Dodge (1972) conducted a study using a 60-item questionnaire. The subjects were 139 patients and 62 nurses. They were asked to rate the importance of different kinds of information. Both nurses and patients agreed that it is very important that the patient be told what is wrong with him. Both patients and nurses placed little

importance on information regarding hospital cost. Several differences were found between the patients and the nurses. The patients were more concerned with results of their diagnostic work, prognoses, or the specifics of their cases. Nurses were more concerned with helping the patient understand what to expect in terms of care.

In a study conducted by Dlouhy, Erickson, Jedlicka, Imburgia, Ipavec, and Kiewlich (1963) it was determined that test procedures and results were of primary concern to patients. They submitted a rating scale to 106 medical-surgical patients. The rating scale was composed of 24 questions patients may have concerning their diagnostic tests. The rating scale results indicated that patients want to know why a test is to be performed, how the equipment will affect them, what they can do to assist, whether the person conducting the test is competent, and what the test results are. The patients were not interested in, nor could they be expected to understand, a scientific explanation of their tests. Their primary interest was in a simplified account so that they might understand and accept the purpose and process of the test. Study results suggested that patients and nurses vary in their beliefs as to what level of information to release to patients to allow them to comprehend their situation.

Pender (1974) interviewed 139 patients to determine if they had received information during their hospital stay, the type of information received, and if there was a need for additional information. The findings indicated that most of the information was from the physician and was concerned with diagnosis, treatment, and treatment procedures. The nurse gave information about nursing care and side effects of treatments. Most patients receiving information from the nurse still needed additional information to satisfy their teaching needs.

Less stress is created when a patient is given specific information which he can assimilate into his own realm of understanding (Meyers, 1964). Additionally, Dodge (1969) supported this idea by stating that understanding is augmented when an individual gets the type of information that he needs in a particular situation.

Preoperative teaching provides the patient with the information he needs to reduce or minimize his stress before diagnostic procedures (Barnett, 1978). This effect was demonstrated in a study conducted on 70 patients receiving information on barium enemas and compared to a control group not receiving any information. The results indicated that the informed patients reported less anxiety during the x-ray procedure.

Johnson (1972) postulated that accurate expectations about sensations reduce stress. An experimental study by Johnson, Morrissey, and Leventhal (1973) was conducted to substantiate Johnson's premise. The subjects, divided into three groups, were 99 patients undergoing endoscopic examinations. Each group was given verbal information prior to the endoscopic examinations. The first group heard a message describing the sensations to be experienced during the examination. The second group heard an objective description of the procedure. The third group received an explanation of the examination. Drug dosages and physiological indicators such as heart rate change, arm/hand movements, gagging, and restlessness were used as indicators of fear. The group of endoscopic examination patients receiving the sensation message required significantly less sedation and exhibited fewer fear indicators than either the control group or the experimental group. Thus, Johnson et al. concluded there were indicators of fear in patients during a procedure when a patient's sensory experience was incongruent with his prior expectations.

Hartfield and Cason (1981) studied 24 patients who received barium enemas to determine if level of anxiety prior to a barium enema differed due to the type of information given. The 24 subjects were divided into three

groups. All 24 subjects received a preliminary test of anxiety, the State-Trait Anxiety Inventory. One group received information on expected sensations. The second group was given information on the procedure and the third group received no information. After the barium enema each subject completed the same anxiety test. Subjects receiving the sensation information demonstrated less anxiety than either of the other two groups.

To determine whether surgery recovery processes were influenced by preoperative fear, extent of information seeking, and amount of information received about surgery, Sime (1976) collected data from 57 female patients scheduled for abdominal surgery. The recovery measure consisted of self-rating of postoperative fear, depression and anger, the number of postoperative analgesics and sedatives, and the total number of postoperative days in the hospital. Results indicated a positive relationship between the level of preoperative fear and length of recovery. A significant relationship was found between level of preoperative fear and the amount of preoperative information. High-fear subjects who reported the lowest amount of preoperative information experienced the longest recovery phase.

Another study by Lindeman and Van Aernam (1971) focused on the value of preoperative teaching of deep breathing,

coughing, and bed exercises. A sample of 261 surgical patients was used. It was hypothesized that structured preoperative teaching would increase the patient's ability to perform postsurgical ventilatory function, would reduce the hospital stay, and would reduce the need for postoperative analgesics. A pretest-posttest static group design was used. The control group received unstructured preoperative teaching. The experimental group received the structured preoperative teaching. The results indicated that structured preoperative teaching improved postoperative ventilatory functions and reduced the length of hospital stay; however, there was no effect on the need for analgesia.

Schmitt and Wollridge (1973) studied the influence of psychological preparation for major abdominal surgery. The sample was comprised of 50 patients divided into an experimental group and a control group. The experimental group participated in small group sessions where they discussed their fears and received information about what to expect. The control group received routine care. The experimental group reported less anxiety, less anesthesia, less use of analgesia, and had a shorter hospital stay. Findings indicated that psychological preoperative preparation decreases anxiety and tension and shortens the postoperative hospital stay.

The literature indicated that patients want information concerning their diagnostic procedures and surgery. These studies on the effect of stress and the patient support the belief that information giving reduces stress in the patient.

Preparing the Cardiac Patient for Invasive Procedures

Today patients are demanding more information regarding their diagnosis, treatment, therapy, and prognosis (Powell & Winslow, 1973). When the public became more aware of their rights, the American Hospital Association developed the Patient's Bill of Rights reaffirming the right of each patient's access to information concerning his condition in terms he can understand (Curran, 1974). The nurse's role in satisfying the patient's right to know is that of teaching (Kory, 1968).

The teaching learning process is more difficult in the busy hospital environment than it is in the classroom (Haferkorn, 1971). There is a variety of ages, disease processes, testing procedures, and learning abilities among any group of patients. Haferkorn considered a broad cross-section of patient characteristics in developing a teaching program for cardiac patients. She assessed the patient's perception ability as an indicator of readiness to learn.

She also noted that when patient teaching is adjusted to patient-perceived individual needs, it can assist the patient to regain his sense of control and thus become ready to receive information. The teaching program Haferkorn used was based on an assessment tool which was a systematic collection of data on the individual patient. Through the use of the data base the nurse was able to determine when the patient would receive information for optimum utilization.

Since it is the right of the patient to know and understand his diagnostic procedures it becomes the nurse's responsibility to explain those procedures to him. First, however, the nurse must have an accurate working knowledge of those procedures and must be an expert in teaching those procedures before she can convey them to the patients (Baden, 1972; Coates, 1976). For example, there are numerous diagnostic procedures the cardiac patient must undergo. Boyek (1972) agreed that there is an optimum time period in a cardiac patient's hospital stay when the patient is most receptive to learning. Baden (1972) recognized that emotional factors contribute to heart action and the way the patient learns to identify and cope with his emotions influences his health. She identified teaching as a major intervention with the cardiac patient to help him through

a stressful hospital stay and recovery at home. She devised a teaching program with strong emphasis on the family on the premise that the family should be educated so that they can help through rehabilitation. Coates (1976) outlined procedures of echo-phonocardiography, electrocardiography, stress testing and nuclear medicine studies so that nurses may use the information to help teach cardiac patients.

Cardiac catheterization produces a severe psychological stress as well as physiological stress on the cardiac patient. Kory (1968) and Swan (1968) reviewed the history of cardiac catheterization, the procedure itself, and complications from the procedure. They agreed that it is essential for the nurse to understand the procedure so that she can explain the procedure to the patient and allay some of his fears and anxieties. Brambilla (1969) agreed that teaching should reflect the physician's policies. Edwards and Payton (1976) reviewed the catheterization process but examined the role of the nurse in more detail than Kory (1968) or Swan (1968). They indicated the role of the nurse in preparing the patient for cardiac catheterization was to reinforce and clarify instructions given by the physician. According to Edwards and Payton, to be able to teach patients, the nurse should thoroughly understand the catheterization process and be able to use various methods of

teaching including individual verbal instruction, written instruction, and audiovisual aids with both types of instruction.

Finesilver (1978) postulated that the psychological stress of the cardiac patient undergoing cardiac catheterization is often due to fear of the procedure, involvement of the heart, fear of the unknown, and fear of impending surgery. Finesilver conducted a study of 40 cardiac catheterization patients to ascertain the effects of preparatory and supportive intervention before, during, and after cardiac catheterization. All subjects completed the State-Trait Anxiety Inventory and the Mood Adjective Check List. During the catheterization the nurse completed a subjective cooperation scale on all subjects. The day after the catheterization the subjects completed a 12-item scale on the degree of upset they felt during the catheterization. The experimental group received preparatory information and supportive intervention after completing the first questionnaires. The control group received routine pre-catheterization care. The results indicated that the experimental intervention decreased the amount of distress the cardiac patient experienced prior to catheterization.

The cardiac patient facing the prospect of cardiac surgery is subjected to additional anxiety and stress

beyond that faced during the diagnostic phase of his hospital stay (Powers, 1968). The patient has an awareness of the possibility of death associated with the surgery, the most important factor underlying his psychological well-being (Powers, 1968). Powers reviewed the factors contributing to the patient's emotional stress. First, the patient is put into the foreign environment of the hospital. The patient may have had to travel many miles to the hospital and may be separated from his family. Second, within the hospital environment the sights, sounds, staff and language are frightening. Powers stated it is the nurses' duty to assist the cardiac patient through the experience by establishing trust. Once the trust is established the teaching-learning process can begin.

Brambilla (1969) devised a teaching plan for persons undergoing cardiac surgery. She gathered data from patients prior to and after surgery to find out what they wanted to know the most. From this list of questions a teaching plan was developed, which included the following six areas: the patient's heart problem, preparation for surgery, the operation itself, the recovery room and intensive care, the time period after intensive care, and discharge planning.

Studies indicated that patients expect education and that nurses are expected to provide the teaching. The

cardiac patient has a great need for teaching. In order to effectively teach cardiac patients the nurse must be knowledgeable of the subject to be taught.

Summary

This chapter has presented a review of the literature dealing with the failure of nurses to fulfill the teaching role, stress and the patient, and preparing cardiac patients for diagnostic procedures and surgery. Chapter 3 presents the methodology used in this study.

CHAPTER 3

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

This was a nonexperimental, descriptive study. The knowledge level of nurses relative to cardiovascular invasive and noninvasive diagnostic procedures was measured and reported. There was no attempt by the investigator to manipulate or control any of the variables in the study.

Setting

This study was conducted in a large southeastern Texas metropolitan area hospital with a bed capacity of 1,148. Approximately 280 beds are allocated for the treatment of adult patients with cardiovascular diseases.

Population and Sample

The population of the study was 60 registered nurses who provide care to cardiovascular patients on the cardiovascular units in the study agency; eight floors of the study agency were identified as cardiovascular nursing units. Convenience sampling was used to obtain the sample. All registered nurses on the 7 am-3 pm and 3 pm-11 pm shifts on one of the three days of data collection were approached to participate in the study. A total of 31 nurses comprised the sample.

Protection of Human Subjects

Permission to conduct the study was obtained from the study agency (Appendix A). Steps were taken to insure the participants' anonymity. A cover letter informed the subjects that return of the questionnaire constituted their informed consent to participate in the study (Appendix B). Subjects were asked not to write their names on the questionnaire. In addition all data related to the study were presented as group data.

Instruments

The instruments used in this study were a demographic data sheet and the Index of Nurses' Knowledge of Cardiac Diagnostic Techniques (INKCDT) developed by Deeves (1980) (Appendix B). Deeves' instrument is a 35-item multiple choice questionnaire. There are 10 questions on invasive procedures (Questions 1, 11, 13, 14, 15, 16, 17, 18, 19, and 25), 10 questions on dynamic noninvasive procedures (Questions 2, 3, 4, 6, 8, 9, 10, 12, 20, and 27), and 15 questions on nondynamic noninvasive procedures (Questions 5, 7, 21, 22, 23, 24, 26, 28, 29, 30, 31, 32, 33, 34, and 35). Each questionnaire was hand scored by the investigator and correct responses were totaled to obtain a total knowledge score. Sub-totals were also obtained to represent knowledge levels of the three procedures.

Deeves (1980) submitted the instrument to a panel of three experts to be examined for content validity. In addition a reliability coefficient of $r = .69$ was obtained using the Kuder-Richardson₂₀ formula.

Data Collection

Upon receiving approval from Texas Woman's University and the study agency data collection began. Eight nursing units identified by the agency as cardiovascular units were utilized by the investigator.

The investigator met with each head nurse individually to discuss the data collection procedure. The head nurses were asked to identify all the registered nurses scheduled to work days and evenings on three previously designated days. The head nurses were asked to distribute the questionnaires with the cover letter and instruction sheet to staff nurses. The staff nurses had five days in which to complete and return the questionnaire to their head nurse. At the end of five days the investigator contacted each head nurse and obtained the returned questionnaires.

Treatment of Data

To analyze the demographic data descriptive statistics such as measures of central tendency and ranges were used. All questionnaires were hand scored and a raw score based

on the number of correct responses was derived for each participant. Means for the group were then computed to determine the knowledge level of the nurses. To determine if there was a difference between the knowledge of invasive procedures, dynamic noninvasive procedures, and nondynamic noninvasive procedures the Friedman ANOVA Test was used.

Summary

It has been suggested in the literature that nurses lack the necessary knowledge to fulfill their teaching role. Therefore, this nonexperimental descriptive study was conducted to determine the knowledge level that cardiovascular nurses possess of cardiovascular diagnostic procedures.

CHAPTER 4

ANALYSIS OF DATA

A nonexperimental study was designed to determine cardiovascular nurses' level of knowledge of invasive and noninvasive diagnostic cardiovascular procedures. This chapter contains the results of the survey of nurses who responded to the 35-item questionnaire entitled Index of Nurses' Knowledge of Cardiac Diagnostic Techniques (INKCDT) and the demographic data questionnaire.

Description of Sample

Sixty questionnaires were distributed to registered nurses who worked in eight cardiovascular nursing units in one hospital. Of the 60 questionnaires, 31 (51.6%) were completed and returned. All respondents were female.

Of the nurses who responded, 22 (71%) worked the 7 am-3 pm shift and 9 (19%) worked the 3 pm-11 pm shift. Nurses on the 11 pm-7 am shift were not included in the study.

The ages of the respondents ranged from 20 to 45 years. The mean age was 28.06 years and the majority, 13 (41%), of the respondents were in the 25-29 year age group (Table 1).

The demographic data questionnaire yielded educational preparation of the 31 respondents. Of the nurses surveyed,

Table 1

Shift Assignment and Age Distribution of 31
Registered Nurses from Cardiovascular
Nursing Units in Knowledge Level Study

Variable	Number	Percent
<u>Shift</u>		
7 am-3 pm	22	71.0
3 pm-11 pm	<u>9</u>	<u>29.0</u>
Total	31	100.0
<u>Ages (Years)</u>		
20-24	9	30.0
25-29	13	41.0
30-34	2	6.5
35-39	5	16.1
40-45	1	3.2
No answer	<u>1</u>	<u>3.2</u>
Total	31	100.0

9 (29%) had earned an associate degree in nursing, 4 (12.9%) had received a diploma in nursing, while the majority, 18 (58.1%), had a bachelor of science in nursing as their basic nursing preparation. When asked their highest educational degree, 30 (96.8%) of the nurses had not received education beyond their basic nursing preparation. Only one (3.2%) of the nurses had obtained a baccalaureate degree in addition to her basic nursing preparation. None of the 31 nurses surveyed had received a master's degree (Table 2).

Table 2

Educational Preparation of 31 Registered Nurses from
Cardiovascular Nursing Units in Knowledge Level
Study

Variable	Number	Percent
<u>Basic Nursing Preparation</u>		
Associate	9	29.0
Diploma	4	12.9
Baccalaureate	<u>18</u>	<u>58.1</u>
Total	31	100.0
<u>Education Beyond Basic Nursing Preparation</u>		
None	30	96.8
Baccalaureate	1	3.2
Master's	<u>0</u>	<u>0.0</u>
	31	100.0

Length of time in the practice of nursing is summarized in Table 3. Eight (25.8%) of the respondents had been in nursing less than one year. The majority of the nurses, 18 (58.1%), had been practicing between one and five years. Two (6.4%) of the nurses had been practicing nursing between 6 and 10 years and three (9.7%) had been practicing between 11 and 15 years.

Seventeen (54.8%) of the nurses had worked with cardiovascular patients less than one year, while 9 (19.1%) of the 31 nurses surveyed had worked with cardiovascular

Table 3

Length of Time Practicing Nursing of 31 Registered Nurses
from Cardiovascular Nursing Units in Knowledge
Level Study

Variable	Number	Percent
<u>Time Practicing Nursing</u>		
Less than 1 year	8	25.8
1-5 years	18	58.1
6-10 years	2	6.4
11-15 years	<u>3</u>	<u>9.7</u>
Total	31	100.0
<u>Time Practicing with Cardiovascular Patients</u>		
Less than 1 year	17	54.8
1-5 years	9	19.1
6-10 years	3	9.6
11-15 years	<u>2</u>	<u>6.5</u>
Total	31	100.0

patients between one and five years. Three (9.6%) of the 31 nurses had between 6 and 10 years experience with cardiovascular patients. Two (6.5%) of the 31 cardiovascular nurses had worked with cardiac patients for 11 to 15 years.

The demographic data questionnaire asked information regarding attendance at continuing education programs on cardiovascular diagnostic procedures and on patient education. Of the 31 nurses surveyed, three (9.7%) had attended continuing education programs on cardiovascular diagnostic

procedures and only six (19.4%) had attended continuing education programs on patient education.

Findings

The Index of Nurses' Knowledge of Cardiac Diagnostic Techniques was completed by the 31 subjects. The first research question asked: What level of knowledge does the cardiovascular registered nurse have of invasive and non-invasive diagnostic procedures? Descriptive statistics were used to determine the level of knowledge the nurses had of the three types of procedures.

Invasive cardiovascular procedures are those procedures involving percutaneous entry into the body, such as cardiac catheterization, while noninvasive cardiovascular procedures are those procedures that do not involve surgical intervention. Noninvasive procedures include dynamic noninvasive and nondynamic noninvasive procedures. Of the two types of noninvasive procedures, dynamic noninvasive refers to the heart in a stress state, for example, the heart rate of a patient using a treadmill. Nondynamic noninvasive procedures require the heart to be in a resting state, for example, an EKG of a resting patient.

Ten questions on the Index of Nurses' Knowledge of Cardiac Diagnostic Techniques were related to invasive procedures (Questions 1, 11, 13, 14, 15, 16, 17, 19, 19, and

25). Of the 10 possible correct answers, 8 was the maximum score obtained; the lowest score was 2. The mean was computed to be 5.45 with a standard deviation of 1.67. The findings obtained on the 10 questions on dynamic noninvasive procedures (Questions 2, 3, 4, 6, 8, 9, 10, 12, 20, and 27) were very similar to those obtained on invasive procedures. The highest possible score on dynamic noninvasive procedures that could be made was 10; the maximum score made was 9 with the lowest score being 2. The mean score of the 31 nurses on dynamic noninvasive procedures was 5.19 with a standard deviation of 1.887. The questionnaire contained 15 questions on nondynamic noninvasive procedures (Questions 5, 7, 21, 22, 23, 24, 26, 28, 29, 30, 31, 32, 33, 34, and 35). The mean level of knowledge was computed to be 7.80 with a standard deviation of 1.72. Of the 15 possible correct responses, the maximum correct responses obtained was 10 and the minimum was 4.

The second research question asked: Is there a difference between the knowledge cardiovascular registered nurses possess of invasive procedures, dynamic noninvasive procedures, and nondynamic noninvasive procedures? The Friedman Two-Way Analysis of Variance was used to determine if differences existed between the knowledge levels of the three categories of cardiovascular procedures. The mean

rank for invasive procedures was 1.69 and the dynamic noninvasive mean rank was 1.65. The mean rank of nondynamic noninvasive procedures was 2.66. The analysis of variance indicated there was no difference between the knowledge cardiovascular registered nurses possess of invasive procedures, dynamic noninvasive procedures and nondynamic noninvasive procedures.

Additionally, the total scores obtained on the Index of Nurses' Knowledge of Cardiac Diagnostic Techniques were examined to determine knowledge levels. The highest possible score that could be achieved was 35, or 100% correct responses. Of the 35 possible correct responses the maximum score was 25, or 71% correct, and the minimum score was 12, or 34% correct. The mean of the total scores on the questionnaire was 18.38 (51%) correct and the median was 18.37 (51%). The standard deviation among the scores was computed to be 3.49, while the standard error was .62. A 95% confidence interval for the mean was computed to be 17.08 to 19.52.

The data sheet which accompanied the Index of Nurses' Knowledge of Cardiac Diagnostic Techniques provided demographic information on the sample. The total knowledge scores acquired on the Index were broken down by selected demographic variables. The Mann-Whitney U was used to

determine if attendance at continuing education programs affected knowledge of cardiovascular diagnostic procedures. A U value of 21.0 was obtained when attendance at cardiovascular continuing education programs was analyzed for its effect on the total knowledge score. There was no difference in knowledge between those who had attended cardiovascular educational programs and those who had not.

Likewise, a Mann-Whitney U was used to examine the effect of attendance at continuing education programs on patient education on the Index of Nurses' Knowledge of Cardiac Diagnostic Techniques. The total score was broken down by whether or not the respondents had attended continuing education programs on patient education. A U value of 55.5 was not significant at $p \leq .05$. Therefore it was concluded that the effect of attendance at continuing education programs on patient education did not influence knowledge of registered nurses working on cardiovascular units.

It was hypothesized that the shift worked by the sample may have an effect on the Index of Nurses' Knowledge of Cardiac Diagnostic Techniques scores. Only those nurses working 7 am-3 pm and 3 pm-11 pm were used. A U value of 89.5 was computed when comparing the effect of shift on the total knowledge score. The effect of shift on the total scores was not significant with the level of significance established at $p \leq .05$.

A Kruskal-Wallis One-Way Analysis of Variance was used to compare the respondents' basic education levels and the total knowledge scores. The first comparison was between the level of basic nursing preparation and the total knowledge score. The sample consisted of subjects with three levels of basic nursing preparation which were associate degree, diploma, and baccalaureate degree. A chi-square value of 5.696 was computed when analyzing the effect of basic nursing preparation on the total score. The level of significance was established at $p \leq .05$. The mean ranks of the three levels of education are as follows: associate at 17.56, diploma at 5.88, and the baccalaureate at 17.47. The diploma prepared respondents demonstrated significantly less knowledge on the Index of Nurses' Knowledge of Cardiac Diagnostic Techniques than either the associate or baccalaureate prepared nurse.

It was recognized that nurses may have education beyond their basic nursing preparation. The Kruskal-Wallis was used to ascertain if there was an effect of additional education on the total knowledge scores by comparing the subjects' basic education with additional scholastic attainment. The associate degree mean rank was 17.56, the diploma mean rank was 6.50, and the baccalaureate mean rank was 16.76. A chi-square value of 3.673 was computed with

a level of significance set at $p \leq .05$. The effect of the highest degree held on the total knowledge scores of the Index of Nurses' Knowledge of Diagnostic Cardiac Techniques was not significant.

A Spearman Correlation Coefficient was used to determine the relationship among selected demographic variables and performance on the Index of Nurses' Knowledge of Diagnostic Cardiac Techniques. The first correlation examined was between the total knowledge scores and the demographic variable of age. A calculated r value of .1905 was not significant at $p \leq .05$. It was determined that age was not related to scores on the Index of Nurses' Knowledge of Diagnostic Cardiac Techniques.

The demographic variable of length of time in nursing was analyzed to determine if there was a relationship with knowledge of diagnostic tests. An r value of .3479, significant at $p = .028$, was obtained. The results indicate that those who worked in nursing a longer period of time scored significantly higher on the Index of Nurses' Knowledge of Cardiac Diagnostic Techniques.

The data were examined to determine if length of time in nursing was related to attendance at continuing education programs on cardiovascular diagnostic procedures. An r value of .1669 was not significant, with the level of

significance set at $p \leq .05$. Consequently it was found that the nurses who had been practicing nursing the longest had not attended more programs on cardiovascular diagnostic procedures than the other nurses.

Additionally, the relationship between length of time in nursing and number of continuing education programs attended on patient education was examined. A value of $r = .3246$ was significant at $p = .037$. It was concluded that the nurses who had been practicing nursing longer had attended more programs on patient education.

Summary of Findings

This study was conducted to determine the level of knowledge cardiovascular nurses had relative to diagnostic cardiovascular procedures. The first question asked what level of knowledge does the cardiovascular registered nurse have of invasive and noninvasive diagnostic procedures. The scores ranged from 12 (34%) to 25 (71%).

Additionally, the study was conducted to determine if there was a difference between the knowledge cardiovascular registered nurses possess of invasive procedures, dynamic noninvasive procedures, and nondynamic noninvasive procedures. The results indicated that there was not a difference between the knowledge the subjects possessed of the three types of diagnostic procedures.

Another finding emerged from the data analysis. It was learned that the associate and baccalaureate prepared nurses scored significantly higher than did diploma prepared nurses on the Index of Nurses' Knowledge of Cardiac Diagnostic Techniques. Other demographic variables, such as shift assignment, additional scholastic attainment, and continuing educational programs of cardiovascular diagnostic procedures and patient education, were examined and had no effect on the total knowledge score.

In addition to these findings, two relationships were established. First, a positive relationship was found between the scores on the Index of Nurses' Knowledge of Cardiac Diagnostic Techniques and the length of time practicing nursing. Second, the length of time practicing nursing was found to be positively related to the number of continuing education programs attended by the respondents.

CHAPTER 5

SUMMARY OF THE STUDY

This nonexperimental study was conducted to determine cardiovascular nurses' level of knowledge of invasive and noninvasive diagnostic cardiovascular procedures. The findings of this study are summarized in this chapter. Conclusions, implications, and recommendations are discussed.

Summary

The literature identified that one of the major roles of the nurse is the teaching role (Brambilla, 1969; del Bueno, 1978; Murdaugh, 1980). Further investigation suggested that nurses have the best opportunity to teach but do not (Syred, 1980). Lack of specific knowledge has been cited as the reason nurses do not teach. There has been little empirical evidence to document the nurses' lack of knowledge. The purpose of this study was to determine nurses' knowledge level of cardiovascular diagnostic procedures.

The knowledge level of nurses relative to cardiovascular diagnostic procedures was determined by a nonexperimental, descriptive study. The study was

conducted in a large southeastern Texas metropolitan hospital. Eight nursing units that had diagnostic cardiovascular patients were selected.

The instrument used was a 35-item questionnaire developed by Deeves (1980). The questionnaire contains 10 questions on invasive tests, 10 questions on dynamic noninvasive tests, and 15 questions on nondynamic noninvasive tests. A demographic data sheet was also used.

Sixty registered nurses providing care to the patients on the five cardiovascular units in the study agency were asked to participate. Convenience sampling was used to obtain the sample from the 7 am-3 pm and 3 pm-11 pm shifts. Of the 60 nurses, 31 responded by completing the questionnaire and demographic data sheet.

The knowledge levels the nurses possessed of cardiovascular diagnostic procedures ranged from 34% to 71% correct responses. A mean of 51% correct responses was computed which indicated the level of knowledge cardiovascular nurses possess of diagnostic procedures was insufficient. There was no difference in their knowledge of invasive procedures, dynamic noninvasive procedures, or nondynamic noninvasive procedures. Those variables which were related to higher scores were educational preparation and length of time spent in nursing. The low scores may be related to the instrument itself.

Conclusions and Implications

The following are conclusions of this study.

1. The nurses surveyed in this study possessed a knowledge level of 34% to 71% on the Index of Nurses' Knowledge of Cardiac Diagnostic Techniques.
2. There was no difference in the amount of knowledge nurses possess between invasive procedures, dynamic noninvasive procedures and nondynamic noninvasive procedures.
3. Baccalaureate and associate degree prepared nurses possessed higher knowledge levels of cardiovascular diagnostic procedures than diploma prepared nurses.
4. Attendance at continuing education programs on cardiovascular diagnostic procedures and patient education was not related to nurses' knowledge levels of cardiovascular diagnostic procedures.
5. The shift worked by nurses was not related to knowledge level of nurses of cardiovascular diagnostic procedures.
6. Additional educational background of nurses was not related to affect the knowledge level of the nurses of cardiovascular diagnostic procedures.
7. Increased age did not affect the nurses' knowledge levels of cardiovascular diagnostic procedures.

8. Nurses practicing a longer period of time possessed a higher level of knowledge of cardiovascular diagnostic procedures than nurses having less experience.
9. Nurses who had been practicing nursing a longer period of time had not attended more continuing education programs on cardiovascular diagnostic procedures than the other nurses.
10. Nurses who had been practicing nursing a longer period of time had attended more continuing education programs on patient education than nurses having less experience.

As a result of this study several implications can be drawn. First, nurses need to develop a more adequate knowledge base of cardiovascular diagnostic procedures. Without an adequate knowledge base, nurses can not fulfill their teaching role.

Second, schools of nursing need to include cardiovascular diagnostic procedures in their curricula. The curricula need to incorporate information of cardiovascular diagnostic procedures in mandatory course work. More indepth study should be provided in elective studies. Continuing education departments of the nursing schools need to offer workshops and courses on cardiovascular diagnostic techniques.

Additionally, inservice education departments within hospitals should provide nurses with programs to develop a greater knowledge level of cardiovascular procedures among its nurses. Hospitals can provide courses designed to meet the learning needs of their nurses by reviewing new diagnostic procedures. By meeting the nurses' learning needs, their ability to teach patients should be enhanced.

Recommendations

The following recommendations are made based on results of this study:

1. This study should be replicated in another area hospital with a cardiovascular service to compare the knowledge levels of more than one institution's nurses of cardiovascular diagnostic procedures.
2. This study should be conducted in various other areas of the country and the results compared to see if geographical differences exist in the knowledge levels of cardiovascular nurses of cardiac diagnostic procedures.
3. A study should be conducted on the effect of a teaching-learning program on nurses' knowledge levels of cardiovascular diagnostic procedures.

APPENDIX A
AGENCY PERMISSION

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING
DENTON, TEXAS 76204

DALLAS CENTER
1810 INWOOD ROAD
DALLAS, TEXAS 75235

HOUSTON CENTER
1130 M. D. ANDERSON BLVD.
HOUSTON, TEXAS 77030

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE Saint Luke's Episcopal and Texas Children's Hospitals

GRANTS TO Elizabeth Lee Souther

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

Do registered nurses practicing in a cardiovascular area have adequate knowledge of invasive and noninvasive cardiovascular diagnostic procedures? The population will consist of the staff nurses assigned to the cardiovascular units. All registered nurses on the 7-3 and 3-11 shifts on duty one of three designated days of data collection will be asked to participate. Participation will be strictly voluntary.

The conditions mutually agreed upon are as follows:

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

Date: November 9, 1981

Elizabeth Lee Souther
Signature of Student

Carol Ann Cavouas
Signature of Agency Personnel

Verna M. Harmon
Signature of Faculty Advisor

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

APPENDIX B
QUESTIONNAIRE PACKET

3686 Ocee
Houston, Texas 77063

Dear Colleague,

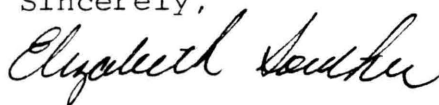
I am currently enrolled in the Master's program in nursing at Texas Woman's University. In partial fulfillment of the requirements for a master's degree I am conducting a study of the knowledge level of nurses of cardiovascular diagnostic procedures.

Your participation in the study is strictly voluntary. The results of the study will be reported as group data. Individual scores will not be traceable to the subjects. RETURN OF THE QUESTIONNAIRE INDICATES YOUR CONSENT TO PARTICIPATE IN THIS STUDY.

You have five days in which to complete the questionnaire. Please return the unsigned questionnaire in the envelope provided you to your Head Nurse.

Your participation in this study is greatly appreciated. The results of the study will be available to you upon request. If you have any further questions feel free to contact me at 977-0369.

Sincerely,



Elizabeth Souther, RN

ES/rb

Enc.

NURSE PROFILE

Please describe your present situation.

AGE: _____

SEX: _____

BASIC PREPARATION FOR PROFESSIONAL NURSING (i.e.,
diploma, baccalaureate degree, associate degree,
or other) _____

HIGHEST DEGREE HELD: _____

POSITION: _____

LENGTH OF TIME PRACTICING PROFESSIONAL NURSING: _____

LENGTH OF TIME WORKING WITH CARDIAC PATIENTS AS A
PROFESSIONAL NURSE: _____

Please answer the following questions regarding
continuing education related to patient teaching.

1. Have you attended any continuing education programs
on cardiac diagnostic procedures: ___yes ___no

If yes, how many? _____

Approximate date of most recent attendance _____

2. Have you attended any continuing education programs
on patient education? ___yes ___no

If yes, how many? _____

Approximate date of most recent attendance _____

What shift do you usually work? _____

On what unit do you work? _____

QUESTIONNAIRE

Directions: Please select the best answer by circling the letter which indicates your response. This is a test of your current knowledge. DO NOT USE references to find your answers.

1. During Holter monitoring the patient may engage in all of the following activities except:
 - a. Sexual intercourse
 - b. Playing golf
 - c. Bronchoscopy
 - d. Stress-rest LVPS
2. After exercise testing the patient should be instructed:
 - a. To continue mild exercise (e.g., walking) for 30 minutes after testing
 - b. Not to eat for 2-3 hours after the test
 - c. Not to take a hot shower for 2-3 hours after the test
 - d. Not to resume any medications for 12 hours after the test
3. During a Thallium-201 stress test, the radioisotope is injected:
 - a. After the resting EKG, but before any exercise
 - b. During the middle of the exercise test
 - c. At the completion of the exercise portion of the test with no further exercise
 - d. At the completion of the exercise portion of the test followed by 20-30 seconds of exercise
4. Which of the following is associated with an increased incidence of "false" negative results during a treadmill exercise test?
 - a. Propranolol (Inderal) therapy
 - b. Digitalis therapy
 - c. Hypokalemia
 - d. Hyperventilation
5. An echocardiogram takes approximately how long to complete?
 - a. Less than 15 minutes
 - b. 30-60 minutes
 - c. 1½-2 hours
 - d. 2-3 hours

6. Which of the following is/are cardiac contraindication(s) for stress testing?
 - a. Unstable angina
 - b. One year postoperative coronary artery bypass
 - c. Mild to moderate hypertension
 - d. All of the above
7. Which of the following events should the patient record in his diary for a Holter monitor?
 - a. Having a bowel movement
 - b. Feelings of heart palpitations
 - c. Taking medications
 - d. All of the above
8. Treadmill stress testing is contraindicated in which of the following noncardiac conditions:
 - a. Amputation with a prosthesis
 - b. Acute renal failure
 - c. Deafness
 - d. Cancer of the prostate
9. In assisting the female patient select clothing for a treadmill stress test, which of the following would be best?
 - a. Comfortable shoes, blouse opening in the front, slacks
 - b. Hospital gown, scrub pants, barefeet
 - c. Pajamas, bra, bathrobe, slippers
 - d. Tennis shoes, bra, blouse opening in the front, skirt
10. Which of the following is associated with an increased incidence of "false" positive results during a treadmill stress test?
 - a. Healed pericarditis
 - b. Hyperkalemia
 - c. Right bundle branch block
 - d. Congestive heart failure
11. Right heart catheterization is most commonly performed in adults using which of the following vessels for insertion of the catheter?
 - a. Basilic vein
 - b. Femoral artery
 - c. Brachial artery
 - d. Femoral vein

12. Prior to exercise testing the patient should be instructed:
- a. Not to take a hot shower 4 hours prior to the test
 - b. Not to smoke 6-8 hours before the test
 - c. Not to eat 3-4 hours before the test
 - d. All of the above
13. The following statements are correct regarding coronary arteriography and its complications except:
- a. In the United States the risk of myocardial infarction and cerebral embolus during or following coronary arteriography is greater with the transfemoral than the transbrachial technique.
 - b. The risk of thrombosis at the site of the catheter entry during or following coronary arteriography is greater with the transfemoral than the transbrachial approach.
 - c. The risk of thromboembolic complications during or following coronary arteriography has been greatly reduced for the transfemoral approach through systemic heparinization.
 - d. The risk of complications or death during or following coronary arteriography is related to the length of time and complexity of the procedure.
14. Which of the following sensations might a patient experience when heparin solution is injected into the vessel prior to left heart catheterization?
- a. Nausea
 - b. Burning in the arm and down the hand
 - c. Tingling and coolness of the arm and down the hand
 - d. He feels nothing
15. If the patient experiences bradycardia during coronary arteriography, which of the following measures will help to correct it?
- a. Have the patient take nitroglycerine sublingually
 - b. Have the patient turn to his left side and shrug the right shoulder
 - c. Have the patient cough immediately
 - d. All of the above

16. Of the following choices, which is the most common complication of cardiac catheterization?
- a. Myocardial infarction
 - b. Hemorrhage
 - c. Contrast reaction
 - d. Thrombosis
17. Which of the following statements is true regarding premedication before cardiac catheterization?
- a. It is given to completely sedate the patient during the procedure
 - b. It is given to reduce the risk of potentially fatal arrhythmias during the procedure
 - c. It is given to reduce the patient's anxiety and to increase patient cooperation
 - d. It is given to decrease the resistance within the coronary arteries to ease passage of the catheter
18. Prior to cardiac catheterization, the patient should be instructed to:
- a. Refrain from taking any type of medication for 48 hours prior to catheterization
 - b. Refrain from eating or drinking anything approximately 8 hours before the procedure
 - c. Remove his hearing aid
 - d. All of the above
19. Causes of prolonged arterial bleeding after transfemoral catheterization include all except:
- a. Hypertension
 - b. Congestive heart failure
 - c. Arteriosclerosis
 - d. Anticoagulant therapy
20. During left ventriculography, the patient may experience which of the following sensations during injection of the dye?
- a. Bad taste in the mouth
 - b. Heaviness in the chest
 - c. Burning in the chest
 - d. Chills
21. Which of the following drugs might be administered during phonocardiography to distinguish between the snap of mitral stenosis and a widely split second sound?
- a. Phenylephrine
 - b. Nitroglycerine
 - c. Propranolol
 - d. Digitalis

Questions 22 through 24 refer to the following patient situation.

Mr. Hart is 5 days postmyocardial infarction. His physician orders a Pyrophosphate Myocardial Infarct Scan (PYP Scan). You go to explain the test to the patient. He begins to cry and states that he is just too tired and weak to have any more tests. He asks if he can wait until next week when he is sure he will feel better and stronger.

22. In answer to his question, you:
- Reschedule the test since a PYP scan is valuable any time between the 5-10th day post M.I.
 - Explain that the test is only valuable between the 1st-6th day after a heart attack to detect recently damaged heart muscle
 - Explain to him that the test is only valuable between the 4-6th days after a heart attack because the isotope can determine permanent versus temporary damage
 - Explain that the test today will be compared to one the following week to determine areas of ischemia versus necrosis and today's test is needed for a baseline
23. Mr. Hart is worried about the radioactivity from the isotope used. You explain:
- There is very little radioactivity so there is no need for worry
 - He should request his pregnant daughter not to visit him for the next 2 days
 - He should be placed on restricted visiting hours for the next 24 hours
 - He should have no visitors for 6 hours after the injection
24. When Mr. Hart does go for the test, you explain that he will be injected with the isotope at the bedside and the scan will be done:
- Within 15 minutes of the injection
 - Approximately 2 hours after the injection
 - 4-6 hours after the injection
 - The following day

25. During right heart catheterization, which of the following measures will aid in the passage of the catheter into the superior vena cava?
- a. Turn the head to the left and take a deep breath
 - b. Have the patient cough deeply
 - c. Raise the head of the table
 - d. Have the patient raise the arm in which the catheter has been inserted
26. A patient undergoing an echocardiogram asks what he will feel. You explain:
- a. A mild vibration on the chest from the sound waves
 - b. Coolness of the conduction jelly
 - c. Mild electrical shock when the transducer touches the chest
 - d. All of the above
27. When referring to the injection of an isotope for cardiac nuclear medicine scans, the injection is given:
- a. Intramuscular
 - b. Intracardiac
 - c. Intraarterial
 - d. Intravenous
28. During the recording of a phonocardiogram, the optimal respiratory pattern for the recording of normal heart sounds is:
- a. Deep inspiration
 - b. The Valsalva maneuver
 - c. Suspended respiration after normal expiration
 - d. Suspended respiration after normal inspiration
29. When recording an electrocardiogram which of the following actions would best reduce the possibility of artifacts from a Gomco suction pump?
- a. Unplug the machine
 - b. Turn the machine off
 - c. Disconnect the patient from the machine, but leave the machine on as usual
 - d. Use an extra lead to ground the patient from the electrical impulses of the machine
30. Approximately how many minutes does a phonocardiogram take?
- a. Less than 15
 - b. 20-30
 - c. 60
 - d. 90

31. The best position for recording an electrocardiogram is to have the patient lying:
- a. Supine and flat in bed
 - b. In semifowlers position
 - c. In dorsal recumbent position
 - d. Position of the patient is not significant
32. A noninvasive diagnostic examination that makes use of high-frequency sound waves to visualize the heart and great vessels best defines:
- a. Electrocardiogram
 - b. Echocardiogram
 - c. Phonocardiogram
 - d. Apexcardiogram
33. Which of the following patients would most likely have a poor recording of an echocardiograph?
- a. Obese individuals
 - b. Extremely thin individuals
 - c. Patients with emphysema
 - d. All of the above
34. The major function of a phonocardiogram is to:
- a. Replace the stethoscope as a means for detecting heart murmurs
 - b. Provide a permanent recording of heart sounds and murmurs
 - c. Record high-pitched sounds in the heart that the human ear cannot detect
 - d. Record the quality of heart murmurs
35. A patient returns from an echocardiogram and asks you what the technologist was referring to when he said, "I am trying to locate the 'window'." How would you reply? "The 'window' refers to:
- a. Your mitral and aortic valves."
 - b. The various displays on the monitor screen."
 - c. A space between the ribs next to the breast-bone."
 - d. The transducer used in taking an echocardiogram."

REFERENCES

- Baden, C. A. Teaching the coronary patient and his family. Nursing Clinics of North America, 1972, 7(3), 563-571.
- Balassi, S. J. Focus on teaching. New York: The Odyssey Press, 1968.
- Barnett, J. W. Patients' emotional responses to barium x-rays. Journal of Advanced Nursing, 1978, 3, 37-46.
- Bigge, M. L. Learning theories for teachers. New York: Harper & Row, Publishers, 1971.
- Boyek, J. What heart patients want to know. . . and what to tell them. Nursing '72, 1972, 2(5), 38-42.
- Brambilla, M. A. A teaching plan for cardiac surgical patients. Cardiovascular Nursing, 1969, 5(1), 1-4.
- Brameld, T. Patterns of educational philosophy. Yonkers-on-Hudson, New York: World Book Company, 1950.
- Coates, K. Techniques in cardiac diagnosis. Nursing Clinics of North America, 1976, 11(2), 261-269.
- Curran, W. J. The patient's bill of rights becomes law. Nursing Digest, 1974, 11(7), 29-31.
- Deeves, M. E. Nurses' knowledge of cardiac diagnostic techniques. Unpublished master's thesis, Texas Woman's University, Houston Campus, 1980.
- del Bueno, D. J. Patient education: Planning for success. Journal of Nursing Administration, 1978, 8(6), 3-7.
- Dloughy, A., Erickson, M. B., Jedlicka, B., Imburgia, F., Ipavec, J., & Kiewlich, S. What patients want to know about their diagnostic tests. Nursing Outlook, 1963, 11(4), 265-267.
- Dodge, J. S. Factors related to patients' perceptions of their cognitive needs. Nursing Research, 1969, 18(6), 502-513.

- Dodge, J. S. What should patients be told? Nurses and patients' beliefs. American Journal of Nursing, 1972, 72(10), 1852-1854.
- Draye, M. A., & Pesznecker, B. Teaching activities of family nurse practitioners. Nurse Practitioner, 1980, 5(5), 28-33.
- Edwards, M., & Payton, V. Cardiac catheterization technique and teaching. Nursing Clinics of North America, 1976, 11(2), 271-281.
- Finesilver, C. Preparation of adult patients for cardiac catheterization and coronary cineangiography. International Journal of Nursing Studies, 1978, 15(4), 211-221.
- Gibbs, J. The education role of the nurse practitioner. The Australian Nurses' Journal, 1980, 10(1), 37-39.
- Graham, B., & Gleir, C. Health education: Are nurses really prepared? Journal of Nursing Education, 1980, 19(8), 4-6.
- Green, T. F. The activities of teaching. New York: McGraw-Hill Book Company, 1971.
- Haferkorn, V. Assessing individual learning needs as a basis for patient teaching. Nursing Clinics of North America, 1971, 6(1), 199-209.
- Hartfield, M. J., & Cason, C. Effect of information on emotional responses during barium enema. Nursing Research, 1981, 30(3), 151-155.
- Hight, G. The art of teaching. New York: Alfred A. Knopf, 1951.
- Johnson, J. E. Effects of structuring patients' expectations on their reactions to threatening events. Nursing Research, 1972, 21(6), 499-503.
- Johnson, J., Morrissey, J., & Leventhal, H. Psychological preparation for an endoscopic examination. Gastrointestinal Endoscopy, 1973, 19(4), 180-182.
- Johnson, P. E. Learning: Theory and practice. New York: Thomas Y. Crowell Co., 1971.

- Kory, R. C. Cardiac catheterization and related procedures. Cardiovascular Nursing, 1968, 4(4), 17-22.
- Lindeman, C. A., & Van Aerman, B. Nursing intervention with the presurgical patient--the effects of structured and unstructured preoperative teaching. Nursing Research, 1971, 20(4), 319-332.
- Meyers, M. E. The effect of types of communication on patients' reaction to stress. Nursing Research, 1964, 113(2), 126-131.
- Murdaugh, C. L. Effects of nurses' knowledge of teaching-learning principles on knowledge of coronary care unit patients. Heart & Lung, 1980, 9(6), 1073-1078.
- Pender, N. J. Patient identification of health information received during hospitalization. Nursing Research, 1974, 23(3), 262-266.
- Pohl, M. L. Teaching activities of the nursing practitioner. Nursing Research, 1965, 14(1), 4-11.
- Powell, A. H., & Winslow, E. H. The cardiac clinical specialist: Teaching ideas that work. Nursing Clinics of North America, 1973, 8(4), 723-733.
- Powers, M. Emotional aspects of cardiovascular surgery. Cardiovascular Nursing, 1968, 4(2), 7-10.
- Schmitt, F. E., & Wollridge, P. J. Psychological preparation of surgical patients. Nursing Research, 1973, 22(2), 108-116.
- Sime, A. M. Relationship of preoperative fear, type of coping, and information received about surgery to recovery from surgery. Journal of Personality and Social Psychology, 1976, 34(4), 716-724.
- Smith, J. P. The challenge of the health education for nurses in the 1980s. Journal of Advanced Nursing, 1979, 4, 531-543.
- Stone, J., & Schneider, F. Readings in the foundations of education. New York: Thomas Y. Crowell Co., 1965.
- Swan, H. J. Complications of cardiac catheterization. Cardiovascular Nursing, 1968, 4(6), 27-30.

- Syred, M. E. J. The abdication of the role of health education by hospital nurses. Journal of Advanced Nursing, 1981, 6, 27-33.
- Volicer, B. J., & Bohannon, M. W. A hospital stress rating scale. Nursing Research, 1975, 24(5), 352-359.
- Webster's third new international dictionary. Springfield, Mass.: G & C Merriam Co., 1967.
- Winslow, E. H. The role of the nurse in patient education. Nursing Clinics of North America, 1976, 11(2), 213-221.