DEVELOPMENT AND EVALUATION OF AN EDUCATIONAL

BOOKLET FOR CARDIAC CATHETERIZATION

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We hereby recommend that the Thesis prepared under

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CHAPTER I

INTRODUCTION

Coronary heart disease is the leading cause of death in the Western world. Perhaps no other illness, with the exception of cancer, has the emotional impact of this disease. Its increasing incidence, despite modern technological and scientific advances, is a frightening reality.

During the past two decades two new approaches to the diagnosis and treatment of coronary heart disease have emerged. They are cardiac catheterization with coronary arteriography and coronary artery bypass graft surgery. Cardiac catheterization with coronary arteriography has been found to be immensely useful in the determination and evaluation of cardiac dysfunctions and in planning medical and surgical treatment for those dysfunctions.

With the rapid increase in the development of biomedical equipment and a concomitant increase in diagnostic procedures, much emphasis is now being placed on patient education by public and professional organizations. Patient education has become an important area of concern within nursing, and empirical evidence of the effects of patient teaching in reaching a variety of goals is beginning

to accumulate. The teaching-learning process needs to be fully evaluated in terms of the effectiveness of patient education programs and in developing methods to assist the patient to learn.

Statement of the Problem

The problem of the study was to develop and evaluate the effectiveness of an educational booklet for patients concerning cardiac catheterization.

Purposes

The purposes of the study were to:

1. Develop an educational booklet focusing on cardiac catheterization

2. Administer a pretest to identify the patient's knowledge concerning cardiac catheterization

3. Conduct a teaching session utilizing the educational booklet developed

4. Administer a posttest

5. Compare pretest and posttest scores

Background and Significance

In the United States in 1976, an estimated 997,766 persons died from cardiovascular disease. This number represented 52 percent of deaths from all causes (Heart Facts 1978). In terms of prevalence, 40,000,000 Americans

are afflicted with some form of heart and blood vessel disease and 4,190,000 of this number represents coronary heart disease (Heart Facts 1978).

According to Blakeslee and Stamler (1976), heart disease remains a continuing epidemic. They further stated that approximately 670,000 Americans die from heart attacks annually. One-fourth of these victims are under the age of sixty-five years; approximately 200,000 more die from brain strokes brought on principally by atherosclerosis. Statistics show that heart disease kills 1,400 Americans daily or about one per minute. Another 500 are killed daily by brain strokes and scores of thousands are incapacitated each year.

Numerous advances have been made to decrease the mortality rate of patients with coronary heart disease. Cardiac catheterization is one of the major diagnostic tests which has attributed to the dramatic advances in cardiology.

Although others had previously passed catheters into the great veins, Werner Forssmann in 1929, at the age of twenty-five years, is given credit for being the first person to pass a catheter into the heart of a living person--himself (Grossman 1974, Hurst 1974).

It is difficult to imagine what our concept of heart disease might be like today if we had to construct them without the enormous reservoir of physiologic and anatomic knowledge derived during the past 30 years in the cardiac catheterization laboratory (Grossman 1974, p. 3).

Selzer (1975) stated that cardiac catheterization and angiocardiography deserve the major credit for the dramatic advances in diagnostic cardiology in the last two decades. He further stated that cardiac catheterization and angiocardiography are indispensable diagnostic procedures and research tools. However, both procedures are invasive and introduce a new and important factor into cardiovascular diagnosis--the element of "risk" to the patient.

Cardiac catheterization and angiocardiography complement each other. The former involves the hemodynamic measurement providing insight into pathophysiology of the disease; inferential information can thus be obtained regarding anatomic relationships. The latter displays directly the anatomic relationships and demonstrates the pathways and sequences of blood flow, thus providing inferential information regarding anatomic-pathophysiologic relationships (Selzer 1975, p. 121).

For most cardiac problems one of the two may suffice, but often the two are combined.

Since cardiac catheterization is categorized as an "invasive" diagnostic test, requiring much expertise and technical excellence, the patient should not be deprived of facts and vital information. The patient has the right to information concerning the diagnostic procedure so that he may make an informed decision about having the test and so that he is able to actively cooperate during the test. He should be informed concerning the indications for cardiac catheterization, contraindications, risks involved, sensations he may experience during and after the test, and benefits of the test. Holloway (1974) stated that by providing patients in advance with the knowledge necessary to solve many potential problems during the catheterization cycle, the patient should be able to cope promptly with problems that may occur.

Much has been written about the teaching-learning process; however, according to Winslow, "there is ample evidence that nurses and other members of the health team are not doing effective, consistent patient teaching" (1976, p. 211). Teaching and learning concepts need to be identified, tested, and implemented in clinical areas. Teaching is an interactive process between a teacher and one or more learners in which the teacher's role centers on activities to promote and assess learning that should or has taken place; the learner's role is to participate in or initiate activities that lead him toward the desired behavior change (Redman 1976). Nurses have an important

responsibility for developing, implementing, and evaluating patient education methods so that a predictive body of knowledge can be established to facilitate desired learning outcomes.

The final but continuous phase of the teachinglearning process is evaluation (Marriner 1975). Evaluation is an elastic word that stretches to cover judgments of many kinds. Evaluation applies the methods of social research and is distinguished from other types of research not by method or subject matter, but intent--the purpose for which it is done. The purpose of evaluation research is to measure the effects of a program against the goals to be accomplished as a means of contributing to subsequent decision-making about the program and improving future programming (Weiss 1972).

Evaluation is an essential element of the teachinglearning process; it is a process by which the teacher and the learner may determine to what degree the educational goals are being attained (Redman 1976). All aspects of teaching and learning are involved, and if viewed as a constructive process, can present a challenge to the nurse to analyze and consequently improve both teaching techniques and learning outcomes (Pohl 1968).

Evaluation may be carried out through a variety of methods and should contain only factual information (Redman 1976). Much evaluation research relies on interviews and questionnaires to collect information about program participants--who they are, what they do in the program, and what their attitudes and behaviors are before and after program participation. Although there are numerous ways to measure the outcome and effectiveness of the teaching-learning process, pretesting and posttesting are most commonly used. Tests are a staple ingredient in the evaluation of educational programs and provide important data on knowledge and learning (Weiss 1972).

Hypothesis

For the purposes of this study, the following hypothesis was formulated:

There will be higher scores on the posttest than on the pretest, demonstrating that learning has occurred from the teaching session utilizing the booklet "You and Your Cardiac Catheterization."

Definition of Terms

The following terms were defined and used throughout this study:

1. <u>Patient</u>--a person who is hospitalized and has given consent for the cardiac catheterization diagnostic test

2. <u>Pretest-posttest</u>--a set of questions directly related to the content of the learning experience, administered to determine the extent of the subject's comprehension of desired information prior to and after completing a new learning experience (Kucha 1972)

3. <u>Cardiac catheterization</u>--the passage of a thin tube (catheter) into the heart via a vein or artery for the purpose of obtaining cardiac blood samples, detection of abnormalities, and determination of intracardiac pressure (Stedman 1976, Heart Facts 1977)

Delimitations

For the purposes of this study, the following delimitations were established:

 Any male or female patient eighteen years and over, who was hospitalized and had given consent for the cardiac catheterization diagnostic test

 Any male or female patient who had not attended any previous classes concerning cardiac catheterization

3. Any male or female patient who was able to communicate in the English language, and who was able to read and write

Assumptions

For the purposes of this study, the following assumptions were offered:

 Patient teaching is an independent nursing responsibility

2. Teaching should be based on the patient's readiness to learn

3. Evaluation is an integral part of the teachinglearning process

Summary

Despite the numerous technological and scientific advances and the sophistication of procedures to decrease the mortality rate, coronary heart disease continues to be the leading cause of death in the United States. Thus, increasing emphasis is being placed on patient education by professional organizations and the general public. The aim of this study was to evaluate the effectiveness of a teaching session utilizing an educational booklet developed for patients having the cardiac catheterization diagnostic test. The purposes and rationale for the study have been delineated in Chapter I.

Chapter II presents an indepth review of literature of atherosclerosis and coronary atherosclerotic heart disease, cardiac catheterization, cardiac health education, and the nurse's role in health education. Chapter III describes the educational booklet developed and the procedure used for collection and treatment of data. Chapter IV provides the results and analysis of the findings obtained, and Chapter V summarizes the study, offers conclusions and implications derived from the analysis and makes recommendations for further studies.

CHAPTER II

REVIEW OF LITERATURE

This chapter will present seven major topics-atherosclerosis and coronary atherosclerotic heart disease; cardiac catheterization historical survey; techniques of cardiac catheterization, indications and contraindications; cardiac health education; and the nurse's role in health education. These topics are presented and analyzed in order to better understand the purposes for this study.

Atherosclerosis and Coronary Atherosclerotic Heart Disease

The major cause of death in the United States and most industrialized societies is arterial degeneration. The largest share of this is attributed to arterosclerosis, a generic term for thickening and induration of the arterial wall. One type of arteriosclerosis is atherosclerosis, the disorder that underlies most arteriosclerotic heart or coronary artery disease (Wintrobe 1977).

Atherosclerosis is derived from the Greek words athéré--mash, gruel and skléros--hardening (Hurst 1974).

Digirolamo and Schlant stated that coronary atherosclerosis

is:

a pathologic condition of the coronary arteries, characterized by abnormal lipid and fibrous tissue accumulation in the vessel wall with resulting disruption of the vessel architecture and function and variable reduction of blood flow to the myocardium (1974, p. 987).

Wintrobe stated that "Atherosclerosis involves primarily the intimal layer and occurs most commonly in the aorta, coronary, and cerebral arteries" (1977, p. 1299). According to Digirolamo and Schlant,

Microscopic lesions appear to undergo progressive changes from (1) fatty streaks or spots, superficial yellow or yellowish-gray intimal lesions, which are stained, selectively by fat stains, to (2) fibrous plaques, circumscribed, elevated intimal thickenings, which are firm and gray or pearly-white, to (3) atheromata atherosclerotic plaques in which fatty softening is predominant, to (4) complicated lesions, in which additional changes such as thrombosis, hemorrhage, ulceration, and calcareous deposits are present (1974, p. 988).

The atherosclerotic process consists of:

 Lipids containing mainly cholesterol and cholesterol salts which are deposited beneath the intima of the major arteries

2. The deposits which become calcified over a period of years, and the fibrous tissue which invade the walls of the degenerating arteries

3. Atherosclerotic plaques which break through the intima of the blood vessel and protrude into the lumen initiating the clot

4. After the small clot develops, platelets become entrapped causing more clots to develop until the vessel becomes plugged; or the clot breaks away and plugs another vessel farther downstream (Guyton 1971)

Although no agreement has been reached on the precise progression of the various changes from the earliest recognizable lesions to the onset of clinical disease, Digirolamo and Schlant summarized the atherosclerotic process and concluded that the following histologic abnormalities are generally accepted as being present at one time or another in the development of the atherosclerotic process.

- Patchy accumulation of lipid, mostly cholesterol and its esters, as well as phospholipid and triglyceride, either intracellularly or extracellularly in the intimal and the inner medial layers of affected arteries
- Fibroplasia, largely confined to the subendothelial portion of the intima, in the form of mucopolysaccharides, reticulin, collagen fibers, and hyalinization
- 3. Fibrin-like film attached to the initial surface or covered by endothelium
- Accumulation of complex carbohydrates increasing the intimal thickness
- 5. Calcification in fine or coarse granules
- Cholesterol crystals and fine, granular, amorphous glycoprotein material

- 7. Medial changes such as lipid infiltration, disintegration of smooth muscle fibers, disruption of elastic fibers, cellular infiltration around vasa vasorum, and mucoprotein accumulation
- 8. Secondary changes such as ulceration, thrombosis, or hemorrhage (1974, p. 988).

Coronary heart disease is the leading cause of death in the United States. Atherosclerosis, as an underlying cause, contributes directly to heart attack and stroke that claims 850,000 lives annually (Heart Facts 1977). Atherosclerosis dwarfs all other single causes of death in the United States (Wintrobe 1977, Heart Facts 1977). Hypertension is the single most important risk factor for the development of atherosclerosis (Keys 1970, Madias 1978). Myocardial infarction is the disease most frequently manifested from atherosclerotic heart disease (Wintrobe 1977). Approximately 40,000,000 Americans have some form of heart and blood vessel disease. This number represents 4,190,000 persons alive today that have a history of heart attack and/or angina pectoris (Heart Facts 1978). "Heart and blood vessel diseases cost the nation an estimated \$26.7 billion in 1977" (American Heart Association 1977, p. 12).

Coronary heart disease no longer represents a disease associated solely with aging, but is seen more in younger persons, particularly men in their third to fifth decade of life. The atherosclerotic process is not limited to any particular age group. Welch (1970) found in his study of 723 men less than forty years old who underwent cinecoronary arteriography primarily for evaluation of chest pain, that 357 (49 percent) were found to have at least 50 percent narrowing of one or more coronary arteries. The youngest person was seventeen years old.

The fact that men are more prone to clinical manifestations of coronary atherosclerosis than are women of childbearing age is universally accepted. However, there is a rapid narrowing of the sex difference in the incidence rate of myocardial infarction or angina pectoris, after the menopause. The sex difference appears to be more marked for the white than the black population (Hurst 1974).

The understanding of coronary atherosclerosis has been enriched by epidemiologic studies. Additional elements have emerged from these studies and certain factors called "risk factors" have shown to be directly associated with coronary atherosclerotic heart disease.

Hurst listed the risk factors for coronary atherosclerotic heart disease (CAHD) as follows:

- I. Nonmodifiable risk factors
 - A. Age
 - B. Sex
 - C. Familial history of premature CAHD
- II. Modifiable risk factors
 - A. Major
 - 1. Elevated serum lipids (cholesterol and triglyceride)
 - Ushitusl diet high i
 - Habitual diet high in total calories, total fats, saturated fats, cholesterol, refined carbohydrates and salt
 - 3. Hypertension
 - 4. Cigarette smoking
 - 5. Carbohydrate intolerance
 - B. Minor
 - 1. Obesity
 - 2. Sedentary living
 - 3. Personality type
 - 4. Psychosocial tensions
 - 5. Others (1974, p. 990).

Fredrickson stated:

There is no blood test for atherosclerosis, nor any satisfactory noninvasive technique for demonstrating its presence. Thus, detection of atherosclerosis usually waits upon one of the clinical complications attending rupture or a critical decrease of blood flow in an involved vessel (1977, pp. 1300-1301).

Medical therapy has proven to be successful in relieving the symptoms. Bypass grafting of obstructing lesions of the coronary arteries, using free grafts of autogenous saphenous vein or the internal thoracic artery, has been applied to large numbers of patients in recent years. But this, too, has only been successful in mainly relieving the symptoms of coronary atherosclerotic heart disease (Hurst 1974, Ross et al. 1978). According to

Ross et al. (1978) coronary artery bypass graft surgery relieves the pain. However, there is some question as to whether or not surgery prolongs life, except in left main coronary artery disease. Studies have shown that if the left main coronary artery is treated medically without surgery, there are higher mortalities (Lipscomb 1975, Ross et al. 1978).

According to Ross et al. (1978), now that by-pass graft surgery has passed from the development phase to one of consolidation and wide acceptance, there is definitely a need to find out more about the quality of life of patients who have undergone open-heart procedures and to learn more of the value of this type of surgery in terms of return to useful employment, use of leisure time, and dependence upon other people.

A survey was conducted at the Wessex Regional Cardio-Thoracic Centre, where approximately 350 open-heart procedures are normally performed annually. Two hundred consecutive adult patients, one hundred males and one hundred females, in all diagnostic categories who had undergone by-pass graft surgery were included in the survey. These patients were assessed for the subsequent twenty months. The survey was designed to provide information about the changes in patients' activities, occupation, and

way of life before and at set intervals after by-pass graft surgery (Ross et al. 1978).

Each patient was interviewed, using a standard questionnaire, at the time of referral for surgery and at two, eight, and twenty months after the operation was performed. The questionnaire elicited information on physical activity, employment, dependence on others, leisure activities, mood, and sexual relationships. Patients under twenty-one years were excluded, but there was no upper age limit. Sixty-six percent were over the age of fifty years, and many who were close to or over retirement age were included (Ross et al. 1978).

The results showed that twenty months after the operation, 68 percent of the survivors denied limitation of normal activity compared with a preoperative figure of 12 percent, and that there had been a corresponding pattern in return to useful employment. Seventy-four percent of men at employable age were back at work or capable of gainful employment, and 76 percent of these had returned to their usual jobs. No correlation was found between the time taken to resume work and the patient's age or diagnosis. There was an equally satisfactory trend in female employment in both full- and part-time jobs,

amounting to a 16 percent increase in the preoperative figure (Ross et al. 1978).

Decreased dependence upon others was readily identified as a significant gain for 73 percent of the patients at the eight-month follow-up. Throughout the subsequent year the favorable trends in employment statistics, use of leisure time, mood, and sexual relationships point to an overall improvement in the quality of life for the majority of patients (Ross et al. 1978).

Dramatic developments have marked the progress of operative techniques devised to treat coronary heart disease since 1916 when Dr. T. Jonnesco successfully treated a patient by performing cervicothoracic ganglionectomy for severe angina pectoris (Yu 1972). A much more accurate and precise method of detecting cardiac dysfunctions has been perfected during the past two decades by introducing long, thin, hollow, flexible tubes into the heart itself. Direct visualization of the heart and coronary arteries by cardiac catheterization and coronary arteriography provide the best means of diagnosis for the physician today. A brief historical resumé, the various techniques, indications, and contraindications of cardiac catheterization will be explored in the following sections.

Cardiac Catheterization Historical Survey

The first recorded intravascular catheterization occurred in 1905 when Fritz Bleichroder introduced a ureteral catheter into his axillary vein and subsequently into the inferior vena cava (Zimmerman 1966). The injection of a radiopaque substance into the vessel of a live person was first performed by Egas Moniz in 1927. Werner Forssmann, however, became the "Father of Selective Angiography" (Baltaxe et al. 1973).

At the age of twenty-five years, while receiving clinical instruction in surgery at Eberswalde, near Berlin, Werner Forssmann catheterized his right atrium by passing a 65-centimeter catheter through a left antecubital vein cutdown. Forssmann looked through a mirror held by his nurse and guided the catheter by flouroscopy until it entered his right atrium. He walked to the Radiology Department (which was on a different level, requiring that he climb stairs), where the catheter position was documented by a chest x-ray. Two years later, Forssmann performed the first angiogram by injecting radiopaque material into the vascular system. After conducting several more experiments of this type, Forssmann's contribution seemed to end at this point, presumably because his

interest did not lie in this direction but rather in urology (Hoechst 1973, Grossman 1974, Hurst 1974).

The potentials of Forssmann's technique were appreciated by Cournand and Richards, who produced a remarkable series of investigations of right heart physiology in man. The achievements of Forssmann, Cournand, and Richards were recognized and rewarded by the Nobel prize in medicine and physiology in 1956 (Grossman 1974, Hurst 1974).

Many persons have contributed to the cardiac catheterization procedure since Forssmann. Advanced developments of this procedure came rapidly. The following is an overview of the highlights and some of the individuals whose contributions have aided in perfecting the cardiac catheterization procedure.

Zimmerman and Lason first introduced retrograde left heart catheterization in 1950. In 1953 Seldinger developed the percutaneous technique which is applied to cardiac catheterization of both the right and left chambers of the heart. Ross and Cope in 1959 were the first to develop transseptal catheterization with major contributions by Braunwald and Morrow, thus making catheterization of both the right and left heart by insertion of a single catheter into a peripheral vessel possible for the first time. Sones, in 1959, developed selective coronary arteriography and perfected it over the ensuing years with the aid of his colleague Shirey. Modified techniques for a percutaneous approach were contributed by Ricketts and Abrams in 1962 and Judkins in 1967. In 1970, a practical balloon-tipped flow-guided catheter technique was introduced by Swan and Ganz, which made possible cardiac catheterization outside the catheterization laboratory (Seldinger 1953, Cope 1959, Ross 1959, Braunwald and Morrow 1960, Ricketts and Abrams 1962, Shirey 1966, Zimmerman 1966, Judkins 1967, Sewell 1969, Swan et al. 1970, Baltaxe et al. 1973, Grossman 1974, Sones 1974).

Techniques of Cardiac Catheterization

Cardiac catheterization refers to several techniques which permit the intubation of the chambers of the heart and great vessels. Positioning of catheters in these structures allows measurement of pressure, sampling of blood, and the injection of certain substances to evaluate function and structure. Cardiac catheterization, as it is performed today, may be defined as "a combined hemodynamic and angiographic procedure undertaken for diagnostic purposes" (Grossman 1974, p. 4). Basic techniques for cardiac catheterization have remained unaltered in recent years. Improvement in the quality of equipment, however, provides more exacting evaluation, especially in selective coronary arteriography.

According to Selzer (1975), cardiac catheterization involves three principle routes of entry: (1) venous catheterization of the right side of the heart, (2) retrograde arterial catheterization of the left side of the heart and the principle arteries, and (3) transseptal catheterization of the left heart chambers. Selzer further stated that the axillary procedures include recording of arterial pressure via an arterial needle, the use of indicator dilution techniques, the use of modifiers of the patient's basal state, such as exercise, drug administration, intracardiac pacing, and recording of intracardiac action potential.

Right Heart Catheterization

Catheterization of the right side of the heart is well known and is now a well-standardized procedure.

Using local anesthesia an antecubital or saphenous vein is isolated and a long, flexible radiopaque catheter is introduced. Alternatively, the percutaneous approach is employed, in which a needle is positioned in the vessel, a flexible wire passed through the needle, the needle removed, and a tapered-tip catheter advanced over the guidewire. Using flouroscopic control, the cardiac catheter

is guided into the right ventricle, the pulmonary artery, and the pulmonary arterial wedge position (Ross and Peterson 1977, p. 1159).

Catheterization of the right side of the heart is performed for several purposes: (1) to evaluate the pressures in the right side of the heart, (2) to identify the presence of left-to-right shunts, (3) to evaluate the pulmonic and tricuspid valves, (4) to identify mitral stenosis and mitral insufficiency, and (5) to calculate cardiac outputs (Grossman 1974, Hurst 1974, Wintrobe 1977).

Left Heart Catheterization

Catheterization of the left side of the heart is considered a supplementary procedure to right-sided studies. Various methods for catheterization of the left side of the heart have been devised. Each method has been found to be applicable under certain circumstances. The retrograde arterial approach is currently the most widely used for catheterization of the aorta and left ventricle (Ross and Peterson 1977).

The catheter usually is inserted via the femoral artery using the percutaneous method or through a small incision directly into the exposed brachial artery. The transseptal approach often is employed to gain access to the left atrium and left ventricle, particularly when disease of a mitral valve is suspected. With this method a catheter is inserted via the right saphenous or femoral vein, and its tip is positioned in the right atrium. A long, curved needle is introduced through the catheter and employed to puncture the intact interatrial septum in the region of the fossa ovalis. Commonly, the catheter then is advanced over the needle into the left atrium and ventricle (Ross and Peterson 1977, p. 1159).

Catheterization of the left side of the heart is performed for the following purposes: (1) to evaluate the pressures in the left side of the heart, (2) to evaluate the muscle function of the left ventricle, and (3) to provide an opportunity for performing selective coronary angiocardiographic studies of the left side of the circulation (Grossman 1974, Hurst 1974, Wintrobe 1977).

Coronary Arteriography

Coronary arteriography has become one of the most frequently performed angiographic procedures. Availability of this technique has been the cornerstone for clinical evaluation of coronary artery disease and for surgical revascularization procedures. The terms "selective coronary arteriography" and "selective coronary cinearteriography" are used interchangeably and imply the positioning of a catheter in the coronary ostia for the purpose of injecting contrast media. The technique of coronary arteriography now universally used consists of repeated selective injections of small amounts of contrast medium into either of the two coronary arteries and recording views in multiple body positions by cinematography. The technique of Sones and Shirey is most commonly used (Hoechst 1973, Selzer 1975).

Coronary arteriography is performed by the selective injection of 5 to 10 ml contrast medium directly into each coronary artery orifice with cinefilming at 30 to 60 frames per s and/or large film or photospot exposures at 4 to 6 per s, thereby obtaining dynamic as well as highresolution images of the coronary arterial tree. Specially designed catheters are used: one type, which has an open, tapered tip and multiple side holes, is inserted via a brachial arteriotomy (Sones technique): another type is advanced over a guide wire inserted percutaneously via the femoral artery and is preshaped to allow ready access to the right or left coronary artery orifice (Judkins technique). Both techniques allow injections to be made with the patient in multiple oblique views and provide visualization of obstructive lesions within the main branches of the coronary vessels (Ross and Peterson 1977, p. 1161).

Collateral vessels, or new vascular pathways which serve to carry blood around a significant obstruction, can be seen, and the vessel beyond a complete obstruction may also be visualized. This has obvious importance in determining the site for implantation of the distal end of a bypass graft (Wintrobe 1977).

According to Hoechst (1973), selective coronary arteriography permits detection of vessels as small as

100 to 200 microns in diameter. Obstruction of 20 percent or more, in vessels at least 1 millimeter in diameter, may be detected as well as the direction of collateral flow. The presence of coronary arteriovenous fistulae and other congenital abnormalities may also be demonstrated.

Sones stated, "The technique of coronary cinearteriography provides a more objective and precise standard of diagnosis for human coronary artery disease" (1974, p. 377). In summary, coronary arteriography is performed mainly to determine the presence or absence of coronary atherosclerosis, but congenital abnormalities may also be easily detected by this procedure. Hoechst (1973) summarized the usual sites for catheter insertion into chambers or vessels to be studied (see table 1).

Indications for Cardiac Catheterization

According to Grossman (1974), the decision to perform cardiac catheterization must be based upon a careful balance of the risk of the procedure against the anticipated value of the information.

Cardiac catheterization is generally recommended when there is need to confirm the presence of a clinically suspected condition, define its anatomic and physiologic severity, and determine the presence or absence of associated conditions (Grossman 1974, pp. 4-5).

TABLE 1

CATHETER INSERTION SITES FOR AREA STUDIED

Area to be Studied Usual Catheter Insertion Site Right Heart 1, 2, 3. . . 1. Brachial vein and tributaries Pulmonary Arteries 1, 2, 3. . . . 2. Saphenous vein Coronary Sinus 1 . . . 3. Femoral vein Vena Cava Superior 1 Inferior 2, 3 Left Atrium. Femoral vein--transseptal technique Brachial artery--Shirey technique Left Ventricle . Anterior thoracic wall--Direct puncture Femoral artery) Retrograde Brachial artery) technique Femoral vein--transseptal technique Femoral artery) Retrograde Aorta. . Brachial artery) technique Coronary Arteries. . . . Brachial artery--Sones technique Femoral artery--Judkins technique

SOURCE: Hoechst Pharmaceuticals, Inc., Directions in Cardiovascular Medicine, Volume III (Somerville, New Jersey: Hoechst Pharmaceuticals, Inc., 1973), p. 23.

According to Hurst,

Cardiac catheterization is performed (1) to confirm the presence of a clinically suspected lesion and simultaneously to exclude associated hidden lesions, (2) to evaluate the severity of a known cardiac lesion, (3) to establish a diagnosis when the specific lesion is not certain but heart disease is known to be present, (4) to establish or disprove the presence of a cardiac lesion when it is not known whether heart disease is present, and (5) to evaluate the completeness and long-term effect of surgical repair (1974, p. 375).

Mendel (1968) concluded that the indications for cardiac catheterization are for evaluation, diagnosis, and research.

Contraindications for Cardiac Catheterization

The contraindications for cardiac catheterization are few. However, according to Grossman,

if it is important to carefully consider the indications for cardiac catheterization in each patient, it is equally important to determine whether there are any contraindications (1974, p. 6).

Cardiac catheterization is generally contraindicated in ventricular irritability which can increase the risk and difficulty of left heart catheterization and can greatly interfere with interpretation of ventriculography. Acute myocardial infarction is clearly a contraindication unless emergency surgery is contemplated, such as mitral valve replacement for papillary muscle rupture, repair of acute ventricular septal defect, or coronary artery by-pass because of continued pain. Although these conditions are contraindications, the concepts of contraindications have been somewhat modified over the past several years because
patients with acute myocardial infarction, cardiogenic shock, intractable ventricular tachycardia, and other extreme conditions have tolerated catheterization and coronary arteriography quite well (Rackley et al. 1972).

Judkins (1967) stated that the recognition of coronary arteriography is no more hazardous than selective cardioangiography, coronary visualization can depict precisely the presence and extent of disease, and the fact that something can be done about coronary artery occlusive disease has extended the indications and increased the demand for detailed coronary delineation. Grossman (1974) and Hurst (1974) concluded that there is no absolute contraindication to cardiac catheterization except the refusal of a mentally competent patient to consent to the procedure.

Cardiac Health Education

Emphasis is being placed on prevention, diagnosis, and rehabilitation of patients with coronary heart disease by public and professional organizations. Breckon (1976) stated that the last decade has been characterized by a knowledge explosion and that preventive medicine in the hospital has come to be called patient education. Numerous articles have been written about the vital importance of teaching the cardiac patient. However, in spite of the

increased emphasis on the need for health education, there is ample evidence that effective teaching is not being done. "There is much evidence that effective, consistent patient teaching is not being accomplished by nurses or, for that matter, by any member of the health team" (Powell and Winslow 1973, p. 723). Three years later, Winslow again stated, "Unfortunately, there is ample evidence that nurses and other members of the health team are not doing effective consistent patient teaching" (1976, p. 211).

Cardiac education as a health care benefit is viewed as a potential force in helping patients understand risk, assess personal and social priorities, make decisions for themselves, take the initiative for maintaining their health, and use professional resources in a self-protecting and economical manner (Levin 1978). The patient's right to knowledge of his condition and its treatment is rationale for patient teaching (Storlie 1973).

According to Niccoli and Brammell (1976), the patient should be taught all of the pertinent aspects of his disease.

Patient education is a planned process that entails the mutual identification of needs, the exchange of knowledge and concerns, and the clarification of personal responsibilities for health, all designed to motivate positive health

practices and to improve the delivery of health care (Breckon 1976, p. 35).

Green (1976) stated that health education can promote cost effectiveness by improving patient, community understanding, and utilization of medical care.

Allendorf and Keegan (1975) interviewed twenty patients in their study to determine the patient's knowledge of angina pectoris and the use of nitroglycerin tablets. The patients ranged in age from thirty-five to sixty-two years, included sixteen men and four women who had suffered from angina from two months to twenty years. The data showed that most did not know enough about nitroglycerin to use it safely and effectively and that "these twenty patients were generally ill-informed regarding the basic pathophysiology of angina and the prudent use of nitroglycerin" (Allendorf and Keegan 1975, p. 1169).

Royle (1973) conducted a study to determine what patients, and their families, knew and felt about their illness and the treatment prescribed. Twenty patients with myocardial infarction were interviewed in the coronary care units and on the general care units of two large hospitals. Her findings were: 1. Initially, the patients and their spouses showed awareness of the diagnosis but their abilities to accept this were influenced by their attitudes of fear, denial, and anger

2. During the acute phase, early convalescent patients did not understand the cause of heart disease or the pathophysiologic changes following the myocardial infarction

3. Patients with previous history of myocardial infarction showed a similar lack of understanding about their illness

Royle (1973) concluded that the patients acquired only limited knowledge of their prescribed therapy. Most described the instructions they received in vague terms, and few were able to give any reason for the prescribed therapeutic measures. She further concluded that patients tended not to request specific information during hospitalization, but they wanted and/or expected to receive information about their heart disease and its effects on their future lifestyles prior to their discharge from the hospital.

In September 1971, President Richard Nixon officially appointed a committee to study health education and to report their recommendations. The committee consisted of sixteen people who represented a variety of diverse interests, both in and out of the health care field. This committee assessed what was being done in health education throughout the country and found very little effective health education of patients in hospitals. The committee made their report in 1973 and recommended that all hospitals offer health education programs to patients and families, both on an inpatient and outpatient basis (Breckon 1976). Since cardiac catheterization is a hospital procedure, inpatient education will be discussed.

Management of Inpatient Education

Inpatient education has been a part of patient care in hospitals for years, but only recently has an awareness developed that such education must be a managed function. Inpatient education must be planned, coordinated, and evaluated as are other aspects of the patient's treatment. According to Lee and Garvey (1978), this realization has come about because of several factors:

1. An increase in the amount of patient education because of increases in the number of available treatments for chronic diseases and in the number of patients with these diseases

2. An increased demand by patients for greater access to health care services, including information about their conditions

3. Documentation of the importance of patient education in reaching positive treatment outcomes

4. An increase in the use of tools such as problemoriented medical records and discharge planning

5. Hospital responsibilities relating to informed consent, liability, and other legal matters

6. Evidence that staff patient education activities are not being coordinated

7. 1975 Joint Commission on Accreditation of Hospitals standards on patient care evaluation, which concludes that the criterium should include demonstrated knowledge of the patient concerning health status, level of functioning, and self-care after discharge

The management of patient education encompasses assessment, goal-setting, planning, implementation, and evaluation. Redman (1976) advocated that goals and behavioral objectives, which include the expected behavior to be exhibited by the patient as well as the learning content to be demonstrated, need to be identified and documented. These goals and objectives should become the basis for subsequent planning and evaluation.

In July 1975, the American Hospital Association conducted a survey to obtain information about how the management process is applied to inpatient education programming at the three levels within the hospital setting--the policy-making level, the program determination and design level, and the implementation level. Survey questionnaires were sent to approximately six thousand community nonfederal, short-term general hospitals. Of these, 2,680 indicated that one or more of their patient education programs compiled with the survey definition of inpatient education, which included educational activities with written goals and objectives for the patient and/or family during inpatient hospitalization. These 2,680 hospitals became the survey universe, but additional information to support and clarify survey findings was gathered from eleven group discussion meetings with the education staffs of eighty-two hospitals (Lee and Garvey 1978).

Of the 2,680 hospitals whose patient education activities were guided by written goals and objectives, only 329 indicated that a written policy existed with regard to inpatient education. Of the hospitals surveyed, 17.2 percent used a committee to set policy for patient education activities, and only 19.1 percent of these

indicated that the committee's sole concern was patient education. The remainder of the hospitals surveyed incorporated the policy-making function for patient education into executive, patient care, or other committees. The survey showed that nurses (93.7 percent), physicians (71.8 percent), and administrators (57.3 percent) are most likely to be found on the policy committees. Consumers, auxilians, and volunteers were most likely to be members of committees whose sole function were to establish patient education responsibilities (Lee and Garvey 1978).

Of the 2,680 hospitals surveyed, fewer than half (45.5 percent), cited specific line responsibility for coordination. The department of nursing was responsible in the majority (57.6 percent) of the hospitals where a line designation was made. Of those hospitals designating a responsible department, 84.6 percent identified a person in the department as being responsible for patient education with only 13.9 percent employed full-time coordinators. About 33.5 percent of the hospitals reported that outside consultants were used to help plan inpatient education programs (Lee and Garvey 1978).

The primary target group for education in the majority (62.4 percent) of hospitals is the patient and his family. According to Lee and Garvey (1978), only 31.8 percent of the hospitals surveyed provided education to the patient alone.

Initial assessment of the patient's and his family's educational needs were obtained as part of the history taken by health personnel in 48.1 percent of the hospitals. In 18.5 percent of the hospitals separate interviews were held with patients to determine their education needs. No initial assessment at all was conducted in 9.7 percent of the hospitals surveyed (Lee and Garvey 1978).

Participation by patients and families in particular programs usually resulted from physician orders (39.4 percent) or by action of another health professional (38.1 percent). A standing order that all patients with a special health need were to receive education unless a physician specified otherwise was used in 18.9 percent of the hospitals (Lee and Garvey 1978).

Nursing care conferences (58.2 percent) and patient care conferences between nurse and physicians (45.3 percent) were most frequently cited as the mechanisms for formal planning of individual patient teaching. Multidisciplinary

team conferences for patient care (24.7 percent) or for patient education (8.8 percent) were less prevalent of the hospitals surveyed (Lee and Garvey 1978).

Nurses were cited as the staff member most involved in planning and teaching patients; more physicians were involved in planning (58.1 percent) than teaching (42.9 percent); and community support groups (42.9 percent) were used as teachers in some educational programs. A wide range of media and materials were available for use in patient education, and 253 hospitals provided a patient education learning center for patients and families, of which 36 of these have designated areas solely for patient education activities (Lee and Garvey 1978).

The data of this study further revealed that 67.5 percent of the hospitals surveyed, made specific provisions for documenting patient education activities somewhere on the medical record. Most of the respondents, 53.8 percent, documented on nursing progress notes; 19.5 percent had separate sheets for documenting patient education; 21.3 percent documented on the discharge planning sheet; and 10.0 percent reported that they documented education on integrated progress notes (Lee and Garvey 1978).

According to Lee and Garvey (1978), the evaluation section of the survey sought to determine (1) the methods used by hospitals to assess the impact of inpatient education on patients, (2) the time evaluation occurred, and (3) the methods used to evaluate an inpatient education program. The data showed that most hospitals, 79.6 percent, used observation of learner task performance; 21.8 percent used interviews with the attending physician. Additional interviews and questionnaires were used by 39.3 percent to determine the patients' and families' attitudes toward the program; 36.9 percent to determine how much information is retained by patients and families; and 33.7 percent to determine the reaction of staff conducting the program (Lee and Garvey 1978).

The majority of the hospitals surveyed, 88.5 percent, evaluated the educational impact on patients before discharge, and only 9.4 percent made use of a postdischarge mailed survey. The least complex forms of evaluation were cited most frequently in terms of methods used by the hospitals to evaluate the education programs; 46.8 percent used staff interviews, and 44.4 percent kept records of the number of patient and family participation in each program. Statistical comparisons of patient readmission rates (9.3 percent) and analysis of inpatient education referrals per total admissions (5.8 percent) were the least used methods of evaluation (Lee and Garvey 1978).

Of those hospitals participating in the survey with at least one patient education program, 58.7 percent used funds from daily hospitalization rates; 7.5 percent billed separately for such services; and 15.5 percent used gifts or grants. Only 25.9 percent of the hospitals' budget funds were used for patient education (Lee and Garvey 1978).

This study revealed that hospitals do differ in where the responsibility for patient education is placed and how the patient education task is undertaken. The information gained from this survey proved to be very beneficial in explaining why effective and consistent patient education is not being done. As a result of this information, and the additional information gained from the eleven-group meetings, the American Hospital Association and the Bureau of Health Education plan to develop education programs and tools to help hospital staffs to become more effective patient educators and in planning continuous patient care activities (Lee and Garvey 1978).

The Teaching-Learning Process

Much has been written about the teaching-learning process and its effectiveness. Effective use of the process and principles of teaching and learning can facilitate the educational process (Redman 1976, Marriner 1975). Pohl stated that "Teaching is the art of helping people learn" (1968, p. 28). She emphasized that the teacher can facilitate learning not only by means of a thorough understanding of the learning process, but also by developing specific skills and abilities in teaching. The teacher must have an understanding of the information to be taught if she is to organize the material and teach it effectively.

According to Redman,

teaching is an interactive process between a teacher and one or more learners. The role of the teacher centers on activities to promote learning and to assess learning that should take place or has taken place. The learner's role is to participate in or initiate activities that lead him toward the desired behavior change (1976, p. 22).

Teaching is generally aimed at behavioral change in the areas of understanding, performance of psychomotor skills, and conscious attitudes (Redman 1971). Education takes place when the individual interprets and integrates the information in such a manner as to bring about attitudinal and/or behavioral change (Rosenberg 1971). Schweer (1972) stated that creativity should be an integral part of the teaching process. She defined creativity as "a quality inherent within every individual" (1972, p. 40), and that "creative teaching is providing unlimited opportunities for individuals and groups to assume responsibilities for furthering their own learning experiences" (p. 41).

Learning is an activity that is essential for the adequate development of the individual as an independent person and as a social being (Pohl 1968). Pohl described learning as "the process by which changes are brought about in an individual's response to his environment (1968, p. 6). Powell and Winslow defined learning as "a change in the individual that fills a need and makes him more capable of dealing adequately with his environment (1973, p. 724).

The survey of literature revealed that most agree that patient teaching is a dynamic process that must begin with an assessment of the patient's problems. "Because learning can be done only by the learner, his needs, interests, abilities, problems, and goals are the only effective starting point for teaching" (Powell and Winslow 1973, p. 724). Teaching is a continuous process of helping patients cope with difficulties in their environment (Aiken 1970).

The patient's ability to learn, however, may be hindered by psychological restrictions he places on himself after life-altering disease or injury occurs. Realization that something is wrong with his body may arouse tension and stress in the patient who has coronary heart disease. Bille (1977) stated that body image, or the mental picture, of the body's appearance changes constantly. There is often a time lag in bringing the body concept up-to-date, such that the mental picture of the self may not be constant with the actual body structure.

A study was conducted at the Saint Joseph's Hospital and the Veteran's Administration Center in Milwaukee, Wisconsin, to determine patients' knowledge of myocardial infarction and compliance with the medical regimen. This study included all patients admitted to these two institutions during May and June, 1975, with a clinical diagnosis of acute or probable myocardial infarction. Twenty-four male patients were studied. The age range was 32 to 75 years, with a mean of 54.12 years. The body-cathexis scale of Secord and Jourard, which is a self-inventory that asks the patient to indicate the strength and direction of feeling which he has about each

of the various parts or functions of his body, was selected as an appropriate measure of body image (Bille 1977).

According to Bille (1977), the findings revealed no significant correlation between body cathexis and achieved knowledge. However, individuals who were satisfied with their body parts and functions reported a higher level of compliance with the medical regimen. Bille (1977) further stated that the hypothesis which proposed that a relationship exists between body cathexis and compliance with posthospitalization prescriptions was statistically significant and body cathexis effects were inferred to be present in compliance behaviors. Thus. the hypothesis was supported. Individuals hold certain health beliefs and values which influence and affect their health status. The teaching-learning process may be beneficial in helping to alleviate the patient's fear and increase his ability to deal with subsequent situations (Holloway 1974). Storlie (1975) cited other factors such as age, educational level, lifestyle, state of health, and stress which may influence the patient's ability to learn.

Enhancement of the teaching-learning process in terms of achieving effective learning outcomes depends partly upon what the patient believes he needs and wants

to know. There is ample evidence that teaching is facilitated when the patient feels the information is important; conversely, teaching is impaired when the patient regards the information as unimportant and/or when he rejects it (Winslow 1976). Redman stated, "Learning is most effective when an individual is ready to learn, that is, when he feels a need to know something" (1976, p. 49). If an individual is to learn, he must be motivated and actively involved in the learning process (Pohl 1968). Once the individual's learning needs are determined, educational objectives can be formulated (Redman 1976).

Although evaluation is the end step in the teaching-learning process, it is definitely an integral part. It is a means of determining whether or not teaching has been successful. Evaluation compares "what is" with "what should be" (Weiss 1972, p. 6). Evaluation involves measuring behavior and interpreting the results according to the desired behavior change. Evaluation also helps the teacher to determine the adequacy of his teaching (Redman 1976).

According to Marriner (1975), the teaching-learning process does not end with the final step--evaluation. She stated that evaluation merely indicated which problems had

been solved and which ones needed to be reassessed, replanned, implemented, and reevaluated. Thus, a continuing cycle is established.

Return demonstrations are appropriate for evaluating the teaching-learning process. Tests are most commonly used, and may be oral as well as written. The principal types of teacher-made test items are short answer, true-false, multiple-choice, matching, and essay (Marriner 1975). The true-false item form is most adaptable for testing knowledge and comprehension of patients (Redman 1976). Fournet (1974) in her study to determine cardiac patients' knowledge concerning diuretics, found the pretest-posttest to be quite effective. Instead of relying upon testing, the nurse may unobtrusively observe the changes in the patient's behavior as a major means of evaluation. Checklists, anecdotal records, and rating scales may be used with this type observation (Marriner 1975). Whatever the method or form used, the evaluation should be recorded on the patient's medical record to facilitate continuity of teaching.

The Nurse's Role in Health Education

Numerous sources support and few would disagree that teaching and patient education is an integral part of the

nursing profession and an important parameter of health care (Storlie 1972, Wrenger and Mount 1974, Redman 1974). "As patients become more knowledgeable in health matters, they are questioning the nature of their impairments and are demanding more awareness of their treatment goals and patterns" (Palm 1971, p. 669).

Nurses today have outgrown their primary role of executing physicians' orders and are now assuming a more collaborated role in the care of patients. They are, therefore, interested in knowing why certain manifestations of disease appear and why a specific therapeutic regimen is chosen rather than simply observing these events passively.

Patient teaching is a professional responsibility of nurses and has been recognized as one of the nurse's most important independent functions (Palm 1971, Baden 1972). According to Bean, "It is generally believed that a primary role of nursing focuses on the education of patients" (1974, p. 587).

Teaching the cardiovascular patients, legally a responsibility of physicians, has become a team effort at Sacred Heart General Hospital in Oregon. The program has been in effect over two years and has become an integral part of daily nursing care. The nursing staff became

more interested and involved in total nursing care and also showed an increase in their knowledge of cardiovascular disease (Duncan et al. 1973).

Because of the unique position of being in close contact with those who need health care, the nurse is the best person to teach the patient (Winslow 1976). The nurse's opportunity for teaching and managing the care of patients is almost unlimited (Niccoli and Brammell 1976). Nurses with a genuine interest in the patient and a recognition of the importance of their teaching function will be motivated to do that teaching (Pohl 1968).

Nurses have the greatest opportunity for patient teaching during incidental, informal patient contacts (Palm 1971). Fournet (1974) stated that the patient is an ideal subject for teaching by members of the nursing profession. She added that teaching the patient the essentials, establishing good rapport and effective communication, teaching at the appropriate time for meeting his needs, rendering emotional support, and showing a sincere concern for his welfare will enhance the effectiveness of what is being taught.

Various methods can be used in the teaching-learning process which include the broad headings of (1) informal teaching, (2) structured teaching, and (3) teaching

through supervision. Pohl (1968) described informal teaching as casual unstructured, "on the spot," teaching that may take place in almost every contact the nurse has with patients; structured teaching refers to instructions that are planned in advance according to a definite teaching guide or outline and scheduled for a specific time and place for one or more learners; teaching through supervision is that teaching by nurses to patients but the contents are guided and directed by an expert practitioner.

According to Marriner (1975), nurses should use both informal and formal methods of teaching. Much informal teaching can be done in conversations between nurse and patient. Such teaching frequently done in response to a patient's questions or comments, is based on the patient's interests and needs, and should be oriented to his future health needs as well as his present condition. Group teaching may also be done informally if the nurse watches for teaching opportunities. Such opportunities may arise while the nurse is caring for patients in a ward or making a home visit in the presence of the patient's friends, neighbors, or relatives. Marriner (1975) further described lectures, discussions, demonstrations, and role-playing as methods of formal teaching.

Guzzetta (1977) randomly selected forty-five patients for her study. The purpose of her investigation was to identify and evaluate criteria which might be useful in prescribing effective learning outcomes. She concluded that a formal cardiac teaching program was beneficial in improving the patient's knowledge of his illness and related health care issues.

There are a number of learning tools available to the nurse for teaching patients. Printed material in books and pamphlets, programmed instruction, pictures, and visual aids including television and motion pictures, models and objects, games, certain situations and environments, and individuals and groups have all proved to be effective in the learning process (Marriner 1975, Redman 1976).

Although several studies (Rosenberg 1971, Lindeman 1972, Rahe et al. 1975) have indicated that group teaching facilitates learning because the individuals have similar problems, individual teaching is by far the most prevalent method used. According to Lee and Garvey (1978), in the hospital survey conducted by the American Hospital Association, one-to-one teaching was used in 96.2 percent of the hospitals.

Marriner (1975) stated that group teaching has several advantages. It is a relatively economical method because it saves considerable time and energy to teach several people at once. It provides an opportunity to share ideas and experiences of patients with similar problems. She concluded that one disadvantage is that an individual's problem may get lost in the discussion, especially if the person is shy or the others are not interested.

If the group method of teaching is utilized, there is still the need to assess each individual patient's learning needs (Zentner and Murray 1975). Edwards and Payton (1976) stated that individual verbal instructions continue to be the most common method for preparing patients for cardiac catheterization.

They further stated that various methods to prepare patients for cardiac catheterization have and are being used. Preoperative visits to catheterization laboratories have been tried; however, no studies were found to indicate their effectiveness or ineffectiveness. Audiovisual aids have been found to be most effective as well as the oral instructions (Holloway 1974). There are advantages of audiovisual instructions and laboratory

visits in that both give the patient the opportunity to see the laboratory and hear the sounds of the equipment.

Holloway (1974), in her study which consisted of a non-random sample of twenty-four patients having elective cardiac catheterization, revealed that patients taught by the audiovisual method did not differ from those taught by the oral method in comprehension of teaching, anxiety after teaching, or anxiety during catheterization. The study did reveal that the amount of time consumed by the audiovisual method was significantly less than that consumed by the oral method.

Summary

Coronary heart disease with atherosclerosis being the underlying factor is the major and leading cause of death in the United States. Dramatic advances have been made during the past two decades to decrease the incidence and also to detect and decrease the manifestations of coronary heart disease.

Cardiac catheterization, an invasive diagnostic test, has proved to be beneficial in the physicians' diagnosis of coronary heart disease. As with any procedure, cardiac catheterization involves certain risks to the patient, but its valued information by far exceeds

the percentage of risks involved. The patient should not be deprived of this vital information so that he may make an informed decision concerning the test.

Patient teaching has been found to be highly effective in increasing the patient's knowledge and decreasing his anxiety about his condition prior to the cardiac catheterization procedure. The nurse, being in a quite unique position, has demonstrated that she is the best person to teach the patient.

CHAPTER III

PROCEDURE FOR COLLECTION AND

TREATMENT OF DATA

Since all of the extraneous variables could not be controlled, a quasi-experimental study, using a onegroup, before-after design was utilized to ascertain the knowledge possessed by patients undergoing the cardiac catheterization diagnosis test. According to Isaac and Michael, the quasi-experimental research design is used "to approximate the conditions of the true experiment in a setting which does not allow the control and/or manipulation of all relevant variables" (1971, p. 14). The sample group was tested before and after exposure to the independent variable of the teaching session utilizing the educational booklet developed, and the results were compared and analyzed. This chapter discusses the setting and population of the study, and the methods utilized in collecting and analyzing the data obtained.

Setting

This study was conducted in a federally-owned 724-bed hospital in a southwestern metropolitan area. This hospital had a nine-bed coronary care unit, a

twenty-eight bed postcoronary care floor which included a four-bed telemetry monitoring room with a central cardiac monitor at the nursing station, and five general medical floors from which patients were selected. An average of two hundred medical patients are admitted to this hospital per month with 50 percent of this number having some manifestation of coronary atherosclerotic heart disease, including acute myocardial infarction and chronic ischemic heart disease. Approximately 350 cardiac catheterizations are performed per year. From January 1, 1978, to August 14, 1978, 192 cardiac catheterizations had been performed with only one death occurring during the procedure because of the patient's multiple medical problems.

This hospital was chosen because of its existing cardiac rehabilitation patient teaching program, which focuses on patients with coronary artery disease and/or myocardial infarction, availability of patients for the experimental group, and accessibility to the researcher. Most of the patients scheduled for the cardiac catheterization diagnostic test vaguely knew what the procedure was, although explanations had been given to them by physicians and nurses.

Population

The convenience and purposive methods of sampling were used to select a total of twenty-five patients for this study. According to Abdellah and Levine convenience sampling is that in which "subjects are selected because they happen to be available for participation in the study at a certain time" (1965, p. 709). These authors further stated that quota sampling is similar to convenience sampling but differs in that quota sampling limits the population size by the use of controls which prevent overloading the sample with subjects having certain These controls are established by characteristics. determining the distribution of the sampling units according to those variables deemed to be important. Treece and Treece (1973) stated that purposive and quota sampling were the same design. Purpose sampling is

. . . a sample in which the sampling units are deliberately (nonrandomly) selected according to certain criteria that are known to be important and are considered to be representative of the target population (Abdellah and Levine 1965, p. 709).

Any male or female patient eighteen years and over, who was hospitalized and had given informed consent for cardiac catheterization, and who had not attended any previous classes concerning the cardiac catheterization

test was included in the study. Patients who were unable to read and write or unable to communicate in the English language were excluded because of their inability to comply with the methodological procedure. In order to be bias-free in the demographic data, the patients were selected at random, meaning that every patient who qualified for inclusion in the study according to the delimitations previously established had an equal chance of being selected. According to Fox (1970), random selection is always bias-free and is advisable particularly to avoid the common criticism, "Of course, you achieved those results, you selected the sample so that you would achieve them" (p. 169). As a result of this method used, all of the patients represented in this study were males who represented different age groups, races, and socioeconomic levels.

Tool

A cardiac catheterization educational booklet (Appendix H) was developed by this researcher. The booklet contained information about anatomy and physiology of the heart, the purpose and procedure of cardiac catheterization, and the sensations that may be experienced during and after the catheterization. Review questions, designed for a pretest-posttest, and a section

for the patient to write any questions that he or she may wish to ask the doctors and/or nurses were also included. According to Abdellah and Levine (1965), the questionnaire is a simple method of data collection which ensures anomymity of the participants and facilitates processing by the investigator. It is also a very effective means of determining the participant's knowledge.

Since the participants would possibly represent different age groups, some with little education from a low socioeconomic status, the booklet was written at a fifth-grade reading level. According to Redman (1971), individuals may learn well from materials written at an adequate reading level and from conversation adapted to their modes of thought and expression. Mohammed (1964) stated that fairly comprehensive health information can be written at a seventh- to eighth-grade reading level, but material written at fourth-, fifth-, or sixth-grade levels can be effective, although the material may be more limited in scope. The length of sentences must be kept short in writing health information at any level. All paragraphs should be constructed so that the average sentence length is about ten words which is consistent with a fourth-, fifth-grade reading level. When writing health teaching materials, the vocabulary difficulty

should be controlled with the exception of essential medical health terms.

The educational booklet, developed by this researcher, was designed so that the language was simple, the print was large and clear, and the material presented was easy to follow. Studies have revealed that comprehension is decreased and apprehension and disinterest are increased with difficult teaching materials (Redman 1971).

The overall objective for developing the educational booklet was to aid the patient in understanding the cardiac catheterization diagnostic test. The behavioral objectives for the patient after reading the booklet during the teaching session were to (1) demonstrate knowledge of the basic anatomy and physiology of the heart, (2) demonstrate knowledge of the purpose and procedure of cardiac catheterization, and (3) demonstrate an understanding of and a compliance with the instructions necessary before, during, and after the procedure.

After the booklet was developed, it was submitted to a panel of four experts in the field of cardiovascular health care for criticism and validation. In order to be useful, a research tool should be valid (Treece and Treece 1973). Fox defined validity as: . . . the extent to which the instrument actually does what it purports to do. . . Obviously, until we have an instrument which does something accurately, there is no hope of it doing exactly what we want it to do (1970, p. 244).

A panel of independent expert judges can be utilized to check for validity (Abdellah and Levine 1965). One judge was a member of the undergraduate faculty at Texas Woman's University, who held a Master of Science degree in Cardiovascular Nursing and had expertise in developing educational booklets and test construction. The second was a clinical specialist at the hospital where the research was conducted, who also held a Master of Science degree in Cardiovascular Nursing and had expertise in the area of test construction. The remaining two panel members were also associated with the hospital where the research was conducted. One was a cardiologist and director of the coronary care and medical intensive care units and the other was a cardiologist and director of the cardiac catheterization laboratory.

The panel members were given an explanation of the study (Appendix F), and asked to evaluate each section of the booklet for overall clarity, conciseness, relevance, and comprehensiveness. They were also asked to supply any additional suggestions and comments (Appendix G). Based on the review by these experts, several revisions were made. The general recommendations made by this panel and incorporated into the booklet included rephrasing sentences and words. The questionnaire for the pretest-posttest (Appendix I) was made more specific, true and false questions were used instead of yes and no, and "don't know" was included to prevent the possibility of participants guessing. The panel agreed that the booklet contained the necessary pertinent information concerning the cardiac catheterization diagnostic test and that there was good distribution of questions on the questionnaire, which were consistent with the problem and purposes of the study.

Following the evaluation from the panel of experts, two fifth-grade instructors from the Dallas Independent School District, one an English-reading instructor and the other a health-science instructor, were verbally asked to review the booklet. They, in turn, gave the booklet to two fifth-grade students to read. The instructors evaluated the booklet based upon the two students' comprehension of the material. The two instructors concluded that the booklet was clear and easy to comprehend at the fifth-grade level.

To further test the educational booklet, the researcher did a pilot study with four patients; two who were scheduled for the cardiac catheterization test for the first time without any previous teaching and two who were scheduled for the procedure, who in the past had previous cardiac catheterizations, but no formal teaching. Based on the review from these four patients, the teaching booklet was determined to be valid and useful.

Data Collection

Prior to the collection of data, permission for the study was obtained from the Human Research Review Committee of the Texas Woman's University (Appendix A). Written approval to conduct the study was also obtained from the hospital according to the Texas Woman's University and the institution's procedure and policy (Appendix B). Written approval was then received from the Graduate Office of the Texas Woman's University to conduct the study (Appendix C).

Collection of data began May 26, 1978, and continued through August 13, 1978. After determining, from the medical record, that the patient qualified for inclusion in the study, each patient was approached by the researcher and given a verbal explanation of the study. The patient was assured that his identity would

remain anonymous, and that he was free to withdraw from the study at any time. In addition, the patient was told that the teaching session would be stopped if he became fatigued or developed any adverse reactions resulting from participation. Written consent was obtained from each patient that was willing to participate utilizing the Texas Woman's University form "Consent to Act as a Subject for Research and Investigation" (Appendix D). The institution's consent form "Part I--Agreement to Participate in Research by or Under the Direction of the Veteran's Administration" (Appendix E) was also utilized and placed in each patient's medical record.

The patient's private room or an area in the hospital conducive to teaching and learning was utilized for the teaching session. Each patient was taught in rooms that had a cardiac monitor and/or x-ray viewer to familiarize him with some of the equipment that he would see in the catheterization laboratory. To insure that no additional formal teaching was done prior to the teaching session, the researcher asked the cooperation of the physicians and nurses during the time of this investigation. Each patient was taught individually, and the time did not exceed one and one-half hours. The questionnaire was given to each patient to complete by

himself without any external assistance. The researcher then left the room and allowed the patient a minimum of twenty minutes to complete the pretest. Immediately following the pretest, the teaching session was implemented utilizing the educational booklet developed by the researcher. A minimum of forty-five minutes was allowed for the teaching session. The teaching session was flexible to give the patient the opportunity to ask questions. A posttest, identical to the pretest, was administered in the same manner to the patient following the teaching session to measure his comprehension of the material presented. Following completion of the posttest, the researcher reviewed both tests with the patient, and reinforced information was given when necessary.

Analysis of Data

Initially the data were compiled, categorized, and classified. Demographic data of the participants were collected which included information concerning age, sex, race, education, occupation, and marital status. Tables were developed from the resulting information to describe the findings. Narration and discussion accompanied the tables to further support the findings.

The frequency distribution, expressed as percentages of the total sample group, was utilized for the demographic
data. Percentage distributions are used often when it is desired to compare two or more distributions (Freund 1970).

The pretest and posttest questionnaires were scored according to the number correct, which yielded ordinal data. Each correct answer to the true-false questions was given a value of one point. If the participant marked "don't know" for a true-false item, one point was subtracted. The difference between the pretest and posttest scores was determined using the Wilcoxon matched-pairs signed-ranks test, which is a useful test to show the magnitude as well as the direction of difference between two pairs (Siegal 1956).

Summary

This was a quasi-experimental study to evaluate the effectiveness of an educational booklet for patients concerning cardiac catheterization. Data were collected from twenty-five patients over a three-month period. The experimental sample group which was in part their own control group was tested before and after participation in teaching sessions, which utilized the educational booklet developed by this researcher. These twenty-five patients were chosen from one hospital and had no previous formal teaching concerning the cardiac catheterization diagnostic test.

The participants' level of knowledge was determined by a questionnaire developed by the researcher. The data were analyzed to show the difference before and after the teaching session.

CHAPTER IV

ANALYSIS OF DATA

This quasi-experimental study was conducted to evaluate the effectiveness of an educational booklet for patients concerning the cardiac catheterization diagnostic test. The patients were tested before and after a teaching session utilizing the educational booklet developed by the researcher.

This chapter presents a description of the participants selected for the study. The results of each statistical analysis is presented, and additional findings are discussed.

Description of the Sample Selection

The sample in this study was comprised of twentyfive patients who were to undergo the cardiac catheterization diagnostic procedure. Thirty patients had originally been selected to participate. One patient stated that he could not read or write very well, only his name and address, and did not wish to participate. Four patients were given an explanation of the study but were unable to participate because of the test being rescheduled due to death in the family, lack of previous medical

record from another hospital, postponement of the test by request of the patient because of his unsureness concerning the procedure, and postponement of the test by the physician.

Table 2 illustrates the age distribution of the participants which ranged from twenty-six to seventy-one years with a mean of fifty-three years.

TABLE 2

Age Range	Number in Group	Percentage of Total
20-29	1 ^{1 1}	4.0
30-39	2	8.0
40-49	4	16.0
50-59	10	40.0
60-69	7	28.0
70-79	· · · · · · ·	4.0
Total	25	100.0

SAMPLE DISTRIBUTION BY AGE

N = 25

The number of males in the sample was twenty-five; there were no female participants. All of the participants were selected from a federally-owned hospital which admits a very small percentage of female patients. Of the twenty-five patients in this sample group, twenty were Caucasian and five were Negro.

Educational background of the sample varied from sixth grade through postgraduate level. Table 3 shows the categories utilized for the educational levels.

TABLE 3

Educational Level	Number in Group	Percentage of Total
Grade school	5	20.0
Some high school	5	20.0
High school graduate	8	32.0
Business or vocational school	1	4.0
Some college	3	12.0
College graduate or beyond	3	12.0
Total	25	100.0

SAMPLE DISTRIBUTION BY EDUCATIONAL LEVEL

N = 25

The participants' occupations ranged from unskilled labor to professional endeavors. Several individuals were unemployed because of retirement and/or disability. Examples of specific categories of occupation are as follows: furniture mover/mechanic, instructor/Safety-CPR, automotive electrician, electrician, industrial engineer, parts manager--Ford Corporation, rancher, welder, warehouse laborer, custodian, plumber, attorney, heavy equipment operator, and mechanic/air conditioningrefrigerator. The participants that were retired/disabled ranged from retirement from military services, Baptist minister, vice president of oil company, jeweler, motion picture distributor, and teacher, to retirement from unskilled, semi-skilled and/or skilled occupations. Since the sample included a diversity of occupations, they were categorized as shown in table 4.

TABLE 4

Number in Group	Percentage of Total
2	8.0
7	28.0
1	4.0 .
1	4.0
2	8.0
<u>12</u>	48.0
25	100.0
	Number in Group 2 7 1 1 2 1 2 <u>12</u> 25

SAMPLE DISTRIBUTION BY OCCUPATION

N = 25

7.1

Most of the patients were married, as depicted in table 5. Other marital status included divorced, separated, or widower. There were no participants in the study who had never been married.

TABLE 5

Marital Status	Number in Group	Percentage of Total
Married	20	80.0
Divorced	3	12.0
Separated	1,	4.0
Widower	<u>1</u>	4.0
Total	25	100.0

SAMPLE DISTRIBUTION BY MARITAL STATUS

N = 25

Appendix J provides a compilation of demographic data. The pretest-posttest scores of each participant are also listed in the appendix.

Presentation of Findings

The Wilcoxon matched-pairs signed-ranks test was used to compare the pretest and posttest scores of this quasi-experimental group. This statistical method utilizes not only the direction of the difference between the scores, but also the magnitude of the difference. Table 6 lists each participant's pretest and posttest scores, as well as the difference between the two test scores.

The hypothesis formulated for this study stated that there would be higher scores on the posttest than on the pretest versus the null hypothesis that there would be no significant difference between pretest and posttest scores. The Wilcoxon matched-pairs signed-ranks test resulted in a statistic, T = 0, which is significant at the 0.01 level (p < 0.1). There was a significant increase in the knowledge of the participants after the teaching session; thus, the alternative hypothesis was supported by the data. The pretest mean was 12.24 and the range was 2 to 19. The posttest mean was 19.16 and the range was 12 to 22. The improvement mean was 6.92 and the range of improvement was 1 to 18.

Table 7 lists the pretest and posttest questions and the number of incorrect responses given by the participants. The number of "don't know" responses was subtracted from the total as was the incorrect responses, but was categorized to show the difference between the two responses.

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TABLE 6

Subject	Pretest	Posttest	Improvement
1	16	18	2
2	14	22	8
3	5	18	13
4	17	19	2
5	15	20	5
6	18	22	4
7	2	12	10
8	13	20	7
9	11	20	9
10	8	15	7
11	18	20	2
12	15	20	5
13	2	20	18
14	10	13	3
15	13	22	. 9
16	5	19	14
17	18	22	4
18	9	21	12
19	14	20	6
20	15	20	5
21	7	19	12
22	19	20	l
23	15	22	7
24	18	20	2
25	9	15	6
1		*	

TABULATION OF RAW SCORES*

*Number correct out of twenty-two possible items.

TABLE 7

NUMBER OF INCORRECT RESPONSES

		Pre	test	Posttest		
	Question	Incorrect	Don't Know	Incorrect	Don't Know	
1.	The heart is a muscle located in the middle of your chest and is about the size of a man's fist.	5	4	1	0	
2.	Your heart pumps blood through veins to all parts of your body.	17	L L	16	1	
3.	The heart normally beats from 60 to 90 times each minute.	3	6	0	1	
4.	Coronary arteries can become blocked and cause heart disease and chest discomfort.	0	3 2.	0	1	
5.	Blood normally travels through the chambers of your heart in \underline{two} directions.	8	12	11	1	
6.	There are valves in your heart which are like one-way doors controlling the flow of blood through your heart.	0	5	0	1	
7.	A cardiac catheterization is a diagnostic procedure.	0	10	2	· 1	
8.	Cardiac catheterization means passing a catheter, which is a long, thin, hollow, flexible tube, into your heart through a large vein or artery in your arm or leg.	0	6	0	1	
9.	Before your cardiac catheter- ization, certain blood tests, a chest x-ray, and an EKG (electrocardiogram) will be done.	0	6	0	1	
10.	You may eat a big meal 1 hour before your cardiac catheter- ization.	0	9		1	
11.	Your cardiac catheterization is done in a special room called the cardiac catheter- ization laboratory ("cath" lab).	0	14	0	1	
12.	Doctors <u>always</u> use the groin area when doing a cardiac catheterization.	4.	9	3	4	

TABLE 7 -- Continued

· ·		Prete	est		Post	Posttest		
	Question	Incorrect	Don't	Know	Incorrect	Don't	Know	
13.	You will be asked to move around on the table to take x-ray pictures and movies of your heart.	5	15	5 5	5	1	*	
34.	You will be awake during the cardiac catheterization.	o	6		0	0		
15.	You will be asked to help during the catheterization by taking a <u>deep</u> breath and holding it, and by coughing <u>hard</u> when the doctor tells you.	0	13	*	0	0		
16.	You may feel <u>hot</u> and <u>uncomfortable</u> when the dye is injected but this feeling will pass quickly.	0	- ⁻ 8		0	1		
17.	Right after your cardiac catheterization, you will walk back to your room.	2	14		0	2		
18.	You will stay <u>flat</u> in bed until you are told you can get up.	0	12		0	0		
19.	After your cardiac catheter- ization, you will be able to eat and drink.	0	16	24 24	l	2		
20.	You should report any signs of coldness, numbness, or bleeding in your arm or leg.	0	4		0	0		
21.	After the cardiac catheter- ization, it is <u>normal</u> for your arm and leg to become cold and numb.	2	21		7	4		
22.	You will be in the hands of a well-trained team for your cardiac catheterization.	0	4		0	_1		
Tota	al	46	198		46	25		

The pretest incorrect responses varied from two to seventeen. Questionnaire items 17, "Right after your cardiac catheterization, you will walk back to your room" and 21, "After the cardiac catheterization, it is <u>normal</u> for your arm and leg to become cold and numb," both received two incorrect responses. Item 2, "Your heart pumps blood through veins to all parts of your body," received seventeen incorrect responses.

The data revealed that there were many "don't know" responses on the pretest, and these responses varied from one to twenty-one in number. The one "don't know" response was given to item 2, but this was also the item most frequently missed by the participants on the pretest. Item 21 received twenty-one "don't know" responses; this item received only two incorrect responses on the pretest.

The data revealed the following findings from the posttest. One finding revealed that most of the participants who had given an incorrect response to a particular item on the pretest tended to give the same response on the posttest. This was especially noted for questionnaire item 2, which was given sixteen incorrect responses on the posttest; only one less response than what was given on the pretest. The "don't know" responses on the posttest only varied from one to four in number.

Seemingly, questionnaire item 2, "Your heart pumps blood through veins to all parts of your body;" item 5, "Blood normally travels through the chambers of your heart in <u>two</u> directions;" item 12, "Doctors <u>always</u> use the groin area when doing a cardiac catheterization;" item 13, "<u>You</u> will be asked to <u>move around</u> on the table to take x-ray pictures and movies of your heart;" and item 21, "After the cardiac catheterization, it is <u>normal</u> for your arm and leg to become cold and numb;" were confusing to the participants. These were the items which were consistently given incorrect and/or "don't know" responses on both the pretest and posttest.

Summary

Statistical analyses utilized in this study favored the alternative hypothesis under investigation at the 0.01 level of significance. The hypothesis stated that there would be higher scores on the posttest than on the pretest, demonstrating that learning had occurred from the teaching session utilizing the booklet "You and Your Cardiac Çatheterization." This quasi-experimental study comprised of twenty-five patients who were taught individually, did improve their knowledge scores after attending one teaching session. Demographic data were

also included only to show sample distribution by age, educational level, occupation, and marital status.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

This study was conducted to evaluate the effectiveness of an educational booklet for patients concerning cardiac catheterization. This chapter summarizes the study and discusses conclusions, implications, and recommendations.

Summary

The problem of this quasi-experimental study was to develop and evaluate the effectiveness of an educational booklet for patients concerning cardiac catheterization. The purposes of the study were to develop an educational booklet focusing on cardiac catheterization, administer a pretest to identify the patient's knowledge concerning cardiac catheterization, conduct a teaching session utilizing the educational booklet developed, administer a posttest, and compare pretest and posttest scores.

The educational booklet contained information concerning anatomy and physiology of the heart, the purpose and procedure of cardiac catheterization, the sensations that may be experienced during and after the

catheterization, review questions, and a section for the patient to write any questions that he or she may wish to ask the doctors and/or nurses. The review questions were used as the pretest-posttest for the study. The booklet was approved by a panel of two cardiovascular nursing specialists and two cardiologists. The booklet was further approved and concluded to be clear and easy to comprehend at the fifth-grade level by two fifth-grade instructors from the Dallas Independent School District. The booklet was pretested by four patients who were representative of the subjects investigated. Approval to conduct the study was obtained from the Human Research Review Committee and from the Graduate Office of the Texas Woman's University. Written approval was also obtained from the hospital utilized to conduct the study.

The convenience and purposive methods of sampling were used to randomly select the twenty-five patients who met the criteria for inclusion in the study. The researcher implemented a forty-five minute teaching session utilizing the booklet developed. The patients received a pretest, to determine their level of understanding of cardiac catheterization, prior to teaching. Immediately following the end of the teaching session,

a posttest, identical to the pretest, was administered to determine the patient's level of learning.

An alternative hypothesis which stated that there will be higher scores on the posttest than on the pretest, demonstrating that learning has occurred from the teaching session utilizing the booklet "You and Your Cardiac Catheterization," was tested in this study. The data obtained in the study revealed that the level of knowledge increased in all of the twenty-five patients tested. Therefore, the hypothesis was supported by the data.

Conclusions

Based on the findings from the study, several conclusions were made. The patients demonstrated an increased level of knowledge after participation in a teaching session concerning cardiac catheterization. This demonstrated that a planned teaching program, utilizing an effective tool, an educational booklet, was beneficial in improving the patient's level of knowledge related to the cardiac catheterization diagnostic procedure.

The results of the study indicated that patients are not well informed about the cardiac catheterization test. Their responses on the pretest and posttest varied with some degree of uncertainty for certain questionnaire items. The responses given may have indicated the patient's knowledge and/or acceptance of the diagnostic procedure and their medical condition. However, these responses may be indicative of the sentence structure of the questions, which may have been confusing to the patient. Consequently, a conclusion was made that these responses may affect patient motivation and readiness to learn, which would in turn, affect compliance with the instructions before, during, and after the procedure. The time segment necessary for completion of the pretest, teaching session, and posttest varied with each patient.

Implications

The findings in this research study suggest implications for nurses in practice, education, and research. These areas are presented separately.

Nursing Practice

Nursing practice is complex and includes an assortment of technical and interpersonal skills. Nursing as a profession involves direct and often personal ministrations to patients. Since nurses are the members of the health care team, in most contact with patients during his hospitalization, they should be aware of the educational needs of the coronary patient.

Based on the findings of this study, patients have limited knowledge about the cardiac catheterization diagnostic test. Therefore, nurses in practice should be motivated to develop and implement a planned teaching program for coronary patients who are to undergo the cardiac catheterization procedure. Nurses should be familiar with the procedure, in order to effectively teach the patient. More nurses should be aware of and instructed in the methodology of conducting patient teaching, in order to effectively assess each individual patient's needs and successfully enhance the teaching-learning process.

An educational booklet and questionnaire, such as the one developed and used for this study, might be appropriate and useful tools to assess the patient's knowledge concerning cardiac catheterization. Patient teaching programs must be planned, coordinated, and evaluated in order to be a continuous process and a meaningful experience for the patient.

Nursing Education

Nursing educators have a responsibility to instill in their students the importance of patient education.

Nursing students should be aware that the effective use of the process and principles of teaching and learning can facilitate the educational process.

Nursing educators should emphasize the importance and necessity of classes pertaining to anatomy and physiology of the heart, pathophysiology and warning signs of coronary heart disease, and the various diagnostic tests that coronary patients may undergo as part of their medical regimen. Nursing educators should prepare their students to assume responsibility to assess educational needs and develop, implement, and evaluate a teaching plan for individual coronary patients. Nursing students, at all levels of nursing education, should be aware of and understand the magnitude of the problem of coronary heart disease, so that they may readily assume responsibility and implement the necessary teaching to patients. From this preparation, nursing students may be better motivated to remain more actively involved as graduate nurses.

Nursing Research

Nurses engaged in research should be familiar with previous studies using educational media. Hopefully, the recommendations of this study will be considered by nurses in research, to provide replication studies and

continuity of research findings. Since the aim of research in nursing is to apply scientific knowledge to methods and techniques for improving professional nursing practice, nurse researchers should continue to do evaluations of coronary patient teaching programs. The various educational media should continue to be tested for effectiveness, in order that the best method of presentation may be used for the individual patient according to his needs.

Recommendations

Based on the findings of this study, the following recommendations are suggested.

 Studies should be conducted using a larger sample size with an experimental and control group of patients, in order to provide comparison data and enhance the validity of the study

 Replication studies should be conducted in various institutions, as in private, state, and federallyowned, to determine if the findings are consistent

3. Replication of this study should be conducted with the addition of another posttest being administered, upon return from the catheterization laboratory, to determine if patients' level of knowledge increased from actual participation in the procedure

4. In an attempt to further validate criteria which might be useful in prescribing effective learning outcomes, studies should be conducted to compare educational media and various types of teaching formats

5. Studies should be conducted to identify and evaluate variables which influence patient readiness to learn, such as age, sex, socioeconomic status, ethic origin, marital status and family involvement, level of education, severity and previous history of coronary heart disease, depression, and denial

6. Studies should be conducted to determine the nurses' motivation and ability to teach patients concerning cardiac catheterization, in order to better predict effective learning outcomes

APPENDIX A

TEXAS WOMAN'S UNIVERSITY

Human Research Committee

Name of	Investigator:	Mary L. Payne		Center:	Dallas
Address:	2749 Northa	aven Road, #3023	Date:	April 17	, 1978
	Dallas, Tex	as 75229	з*	•	
		× 2			
		· · · · · · · · · · · · · · · · · · ·			

Dear Ms. Payne:

Your study entitled <u>Booklet for Cardiac Catheterization</u> has been reviewed by a committee of the Human Research Review Committee and it appears to meet our requirements in regard to protection of the individual's rights.

Please be reminded that both the University and the Department of Health, Education and Welfare regulations require that written consents must be obtained from all human subjects in your studies. These forms must be kept on file by you.

Furthermore, should your project change, another review by the Committee is required, according to DHEW regulations.

Sincerely,

keyldin m. Gonen

Chairman, Human Research Review Committee at Dallas

APPENDIX B

TEXAS WOMAN'S UNIVERSITY COLLEGE OF NURSING DENTON, TEXAS 91

DALLAS CENTER 1810 Inwood Road Dallas, Texas 75235 HOUSTON CENTER 1130 M.D. Anderson Blvd. Houston, Texas 77025

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE Veteran's Administration Hospital--Dallas, Texas

GRANTS TO Mary L. Payne

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:

Development and Evaluation of an Educational Booklet

for Cardiac Catheterization

The conditions mutually agreed upon are as follows:

- 1. The agency (may) (may not) be identified in the final report.
- position
 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 5/26 78	Kil Locant
	Signature of Agency Personnel
Mary K. Sarge	auncie Stepting and Put
Signaturé of student	Signature of Faculty Advisor

APPENDIX C

BEILERNE MANN

TEXAS WOMAN'S UNIVERSITY





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THE GRADUATE SCHOOL P.O. BOX 22479, TWU STATION

July 24, 1978

Miss Mary Lou Payne 2749 Northaven Road, #3023 Dallas, Texas 75229

Dear Miss Payne:

I have received and approved the Prospectus for your research project. Best wishes to you in the research and writing of your project.

Sincerely yours,

Phyllis Bridges Dean of the Graduate School

PB:dd

cc Mrs. Alfreda Stephney Dr. Anne Gudmundsen Nursing Center Graduate Office

APPENDIX D

TEXAS WOMAN'S UNIVERSITY

xm B = Oral presentation to subject)

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sent to Act as a Subject for Research and Investigation:

I have received an oral description of this study, including a fair lanation of the procedures and their purpose, any associated discomforts or ks, and a description of the possible benefits. An offer has been made to to answer all questions about the study. I understand that my name will not used in any release of the data and that I am free to withdraw at any time.

Signature		Date				
		•	ж А			
Witness	<u> </u>	Date				

tification by Person Explaining the Study:

This is to certify that I have fully informed and explained to the above ed person a description of the listed elements of informed consent.

Signatur	e .	Date	-	<u> </u>
<u>Texas</u> Position	Woman's	University	-	Graduate Student

less

Date

APPENDIX E

		PARI	I-AG	GREEMENT TO	J P	ARTIC	CIPATE IN RI	ESEARCH
BY	OR	UNDER	THE	DIRECTION	OF	THE	VETERAN'S	ADMINISTRATION

1. I						oluntarily consent to pa	ticinate as a subject
(Type or print subject's name)					norpare as a rabject		
in the investigation entitled	Development	and	Evaluation	of	an	Educational	Booklet
(Title or study)							

DATE

for Cardiac Catheterization

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2. I have signed one or more information sheets with this title to show that I have read the description including the purpose and nature of the investigation, the procedures to be used, the risks, inconveniences, side effects and benefits to be expected, as well as other courses of action open to me and my right to withdraw from the investigation at any time. Each of these items has been explained to me by the investigator in the presence of a witness. The investigator has answered my questions concerning the investigation and I believe I understand what is intended.

3. I understand that no guarantees or assurances have been given me since the results and risks of an investigation are not always known before hand. I have been told that this investigation has been carefully planned, that the plan has been reviewed by knowledgeable people, and that every reasonable precaution will be taken to protect my well-being.

4. Nevertheless, I wish to limit my participation in the investigation as follows:

	5
VA FACILITY	SUBJECT'S SIGNATURE
Dallas, Texas	
WITNESS'S NAME AND ADDRESS (Print or type)	WITNESS'S SIGNATURE
INVESTICATOR'S NAME (Print or type)	INVESTIGATOR'S SIGNATURE
Mary Lou Payne, R.N.	
Signed information Signed information Sheets attached.	Texas Woman's University - Graduate
SUBJECT'S IDENTIFICATION (1. D. plate or give name-last, first, middle)	SUBJECT'S I.D. NO.
· · ·	AGREEMENT TO PARTICIPATE IN RESEARCH BY OR UNDER THE DIRECTION OF THE VETERAN'S ADMINISTRATION
· · ·	YA FORM JUN 1975 10-1086 SUPERSEDES VA FORM 10-1096 MAY 1967, WHICH WILL NOT BE USED.

APPENDIX F

April 27, 1978

Dear

I wish to thank you for consenting to be on my panel of experts. This study, entitled "Development and Evaluation of an Educational Booklet for Cardiac Catheterization" will be conducted to evaluate the effectiveness of an educational booklet by determining the knowledge of patients that will undergo the cardiac catheterization procedure. The purposes of the study are as follows:

1. Develop an educational booklet focusing on cardiac catheterization

2. Administer a pretest to identify the patient's knowledge concerning cardiac catheterization

3. Conduct a teaching session utilizing the educational booklet developed

4. Administer a posttest

5. Compare pretest and posttest scores

The accompanying checklist has been developed as a tool for validation of the content of the booklet. Please evaluate each section of the booklet for overall clarity, conciseness, relevance, and comprehensiveness. Your suggestions and recommendations are most welcomed.

I appreciate very much your time and assistance.

Sincerely,

Mary L. Payne, R.N., B.S.N. Texas Woman's University Graduate Student

Attachment

APPENDIX G

VALIDATION CHECKLIST FOR EDUCATIONAL BOOKLET,

"YOU AND YOUR CARDIAC CATHETERIZATION"

Part I--Anatomy and Physiology

1.	Is this section appropriate for the patient as a learner?	YES	NO
2.	Is the information comprehensive and clear?	YES	NO
3.	Are the review questions designed for a pretest-posttest adequate to evaluate the patient's knowledge?	YES	NO
4.	Additions and revisions necessary?	YES	NO
Com	ments.		

Part II--What is a Cardiac Catheterization?

1.	Is the information presented clear and easy to understand?	YES	NO
2.	Is the material inclusive?	YES	NO
3.	Additions and revisions necessary?	YES	NO

Comments:

Part III--Before Your Cardiac Catheterization

1.	Is to	the information presented clear and easy understand?	YES	NO				
2.	Is	the material inclusive?	YES	NO				
3.	Additions	and	revisions	necessar	ry?		YES	NO
-----	-----------	-----	-----------	----------	-----	---	-----	----
	4					•		
Com	ments:							

Part IV--During Your Cardiac Catheterization

1.	Is the material presented in this section appropriate?	YES	NO
2.	Is the information clear and easy to comprehend?	YES	NO
3.	Additions and revisions necessary?	YES	NO
Com	nents:		

Part V--After Your Cardiac Catheterization

1.	Is the information clear and easy to understand?	YES	NO
2.	Is the material inclusive?	YES	NO
3.	Are the review questions designed for a pretest-posttest adequate to evaluate the patient's knowledge?	YES	NO
4.	Additions and revisions necessary?	YES	NO

Comments:

Part VI--Overall Content Evaluation

1.	Is it well written and on a fifth-grade level for patient teaching?	YES	NO
2.	Is it free from ambiguity?	YES	NO
3.	Is it appropriate for the study?	YES	NO
4.	Has the material been covered adequately?	YES	NO
5.	Is the sequence of the material presented appropriate for patient teaching?	YES	NO
6.	Are illustrations and size of booklet appropriate for patient teaching?	YES	NO
	· · · · · · · · · · · · · · · · · · ·		

Comments:

Date Signed

.

APPENDIX H



You And Your Cardiac Catheterization

Mary L. Payne, R.N.

YOU AND YOUR CARDIAC CATHETERIZATION

by

Mary L. Payne, R.N., B.S.N.

Illustrations by:

Thomas D. Sims

Medical Illustration Services

UT Health Science Center at Dallas

C Mary Payne 1978

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REMEMBER!!!)
REVIEW QUESTIONS (AND ANSWERS)	

PURPOSE

This booklet will explain a diagnostic procedure called cardiac catheterization. Your doctor feels this procedure is necessary to help him in your treatment. Before having this procedure, you and your family need to understand:

- 1. The purpose of cardiac catheterization
- 2. How cardiac catheterization is done
- 3. Feelings or sensations you may have during and after the procedure

There will be questions about what you have just read after each section in this booklet. The answers will be given at the end of each section of questions. Please feel free to ask your doctor and nurses about anything in this booklet you do not understand.

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YOUR HEART AND HOW IT WORKS

Your heart is a hollow, four-chambered organ located in the middle of your chest. Each side has two hollow chambers. The top two chambers are called atria.



The bottom two chambers are called ventricles.

Blood travels from each chamber of your heart in <u>one</u> direction through valves. Valves are like one-way doors that control the flow of blood.



This valve is working correctly.

If your heart values are not working correctly, blood might go backwards causing stress on one or more parts of the heart.



Your heart has two sides. The right side receives blood from the body through veins and pumps it into your lungs. The lungs supply the blood with oxygen. Fresh blood travels from the lungs to the left side of your heart. From the left side, blood is pumped out again to all parts of your body through arteries. Right heart---- Lungs---- Left heart---- Rest of body



The heart normally beats at a rate of 60 to 90 times each minute. Each time your heart beats, fresh blood containing food and oxygen is delivered to all parts of your body. <u>All parts</u> of your body need food and oxygen to do its work, even <u>your</u> <u>heart</u>. While your heart pumps blood to meet your body's needs, your heart itself is nourished by its own arteries called coronary arteries. The coronary arteries bring to your heart the blood necessary for it to function (work) well. If your coronary arteries become blocked, heart disease occurs and you may feel chest discomfort.

Coronary Arteries

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REPORTS OF F



Normal Coronary Artery

REVIEW QUESTIONS???

1. The heart is a muscle located in the middle of your chest and is about the size of a man's fist.

True False Don't Know

2. Your heart pumps blood through veins to all parts of your body.

True False Don't Know

3. The heart normally beats from 60 to 90 times each minute.

True False Don't Know

4. Coronary arteries can become blocked and cause heart disease and chest discomfort.

True False Don't Know

5. Blood normally travels through the chambers of your heart in two directions.

True False Don't Know

 There are valves in your heart which are like one-way doors controlling the flow of blood through your heart.

True_____ False____ Don't Know

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WHAT IS A CARDIAC CATHETERIZATION?

Cardiac catheterization means passing a catheter (a long, thin, hollow, flexible tube) into your heart through a large artery or vein in your leg (groin) or arm. It is called a <u>diagnostic</u> procedure because it will help your doctor <u>diagnose</u>, or find out, if you have a heart problem and what is causing it. A cardiac catheterization is only a diagnostic procedure and will not correct your heart problem.

The doctor takes pictures and pressure measurements of the inside of your heart chambers. He looks at the arteries and veins connected to your heart and the working of your values.

By doing this test, your doctor will be able to:

- 1. Locate blockage of the coronary arteries
- 2. Study the four chambers of your heart
- 3. Study your heart valves



BEFORE YOUR CARDIAC CATHETERIZATION

The procedure will be done in the hospital. You will have blood tests, a chest x-ray and an EKG (electrocardiogram). You <u>may</u> have an Exercise Tolerance Test, which is a special test to determine how your heart functions when you are doing exercises.

Your doctor will explain to you about the cardiac catheterization and any risks involved. Be sure to tell the doctor about any allergies you may have. You will be asked to sign a form permitting the doctor to do the procedure.

If your catheterization is to be done in the morning, you will not be allowed to eat or drink anything after midnight or at least 8 hours before the procedure.

Be sure to give your valuables to a family member, the charge nurse or take them to the clothing room the day before the procedure.



You may keep your dentures, eye glasses, or hearing aid during the procedure.

Be sure to urinate (pass your water) before leaving your room. You will go to the catheterization laboratory on a stretcher.

DURING YOUR CARDIAC CATHETERIZATION

Your cardiac catheterization will be done in a special room called the cardiac catheterization laboratory ("cath" lab).

When you arrive in the "cath" lab; you will see a lot of equipment. You will lie on a table, which has an x-ray machine over it. The <u>table rotates</u> so that the doctor can take pictures of your heart from different angles. Safety belts prevent you from sliding when the table is turned.

There will be a monitor to watch your heartbeat and a TV screen to show pictures of your heart during the catheterization.



A team of doctors, nurses, and technicians who are specially trained in cardiac catheterization will be doing the procedure. These people will be wearing green masks and gowns.

You will be awake and may hear technical talk between the team members during the procedure.

The nurse or technician will scrub and shave the areas where the catheters will be inserted. These areas are covered with sterile towels and sheets.



Everything must be clean, so you must try not to move your arms or legs or touch the clean areas.

An "I.V." (allows fluid to go through your vein) will be inserted in your arm so that medications may be given when necessary.

It is important that you remain as still as possible. You may find this uncomfortable, if so, tell the "team" and they will try to make you more comfortable.

The doctor will inject a local anesthetic into the area where the catheters are to be inserted. This medicine will numb this area so you will not feel any pain; however, you may feel pressure. A special needle is used to make a puncture into the blood vessel in your groin <u>or</u> a small incision will be made into the blood vessel in your arm. The catheter is passed through the blood vessel into your heart.

A special dye is injected which makes it possible to see the chambers, valves and blood passing through your coronary arteries. While the dye is being injected, you may have a hot, uncomfortable feeling, "hot flush," and possibly feel sick to your stomach. These feelings are normal and pass within minutes.

A series of x-ray pictures are taken of the different parts of your heart; therefore, the doctor may change your position and turn the lights off several times. The camera makes a lot of noise as the pictures are taken.

You may have chest discomfort during the catheterization. This is common, but be sure to tell the doctor. He may give you medications to relieve the discomfort.

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During the procedure you will be asked to take a slow deep breath, and hold your breath while a movie is taken. Also, the doctor may tell you to cough. Your cooperation is very important.

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When all the x-rays and movies of your heart are finished, the catheters are removed. If your groin area was used, the doctor will apply pressure with his hand to this area until the bleeding has stopped and then place a tight bandage over the area. If your arm was used, the doctor will place several stitches in the area to stop the bleeding and to repair the blood vessel. These stitches will be removed in 3-7 days.

AFTER YOUR CARDIAC CATHETERIZATION

You will return by stretcher to your room. Your blood pressure and pulse will be checked frequently. The area where the catheter was inserted will be checked for bleeding. The nurse may place a small sandbag over your groin area. You should <u>stay in bed for 24</u> <u>hours</u> following the procedure. You need to stay <u>flat</u> in bed for 12 hours if your groin area was used and for 2-3 hours if your arm was used. Try not to bend your arm or leg where the catheter was inserted. You should not smoke during this time.

Your head may be raised when you eat or drink. You will need to drink plenty of water or other liquids to help "flush" the dye out of your body.

If your arm or leg should feel numb, cold, or begins to bleed, call the nurse right away.



You may have visitors when you are back in your room. After the film is developed, the doctor will look at the movies made during the catheterization and will report to you as soon as the information is complete.

REMEMBER ! ! !

Before the Catheterization

- Understand the procedure and sign consent form.
- Tell your doctor about any allergies you may have.
- 3. Do not eat or drink anything after midnight or at least 8 hours before the procedure.
- 4. Urinate before getting on the stretcher.



During the Catheterization

- 1. Lie still on the x-ray table.
- 2. Tell the "team" if you feel any discomfort.
- 3. Take slow deep breaths, hold your breath,
 - and cough when the doctor tells you.

After the Catheterization

1. Stay in bed until you are told you can get
up. So---no smoking! (\)



- Do not bend your leg (if your groin area was used in the procedure) for 12 hours.
- Do not bend your arm (if your arm was used in the procedure) for 2-3 hours.



4. Report any signs of coldness, numbness, or bleeding in your arm or leg.



REVIEW QUESTIONS ? ? ?

1. A cardiac catheterization is a diagnostic procedure.

True False Don't Know

 Cardiac catheterization means passing a catheter, which is a long, thin, hollow, flexible tube, into your heart through a large vein or artery in your arm or leg.

True False Don't Know

3. Before your cardiac catheterization, certain blood tests, a chest x-ray, and an EKG (electrocardiogram) will be done.

True False Don't Know

4. You may eat a big meal 1 hour before your cardiac catheterization.

True False Don't Know

5. Your cardiac catheterization is done in a special room called the cardiac catheterization laboratory ("cath" lab).

True False Don't Know

6. Doctors <u>always</u> use the groin area when doing a cardiac catheterization.

True False Don't Know

7.	You	will	be	asked	to	move	around	on	the	table	
	to	take :	x-ra	y pict	ure	es and	1 movie:	s of	you you	r heart	•

True False Don't Know

8. You will be awake during the cardiac catheterization.

True False Don't Know

9. You will be asked to help during the catheterization by taking a <u>deep</u> breath and holding it, and by coughing hard when the doctor tells you.

True ____ False ____ Don't Know ____

10. You may feel hot and uncomfortable when the dye is injected but this feeling will pass quickly.

True False Don't Know

11. Right after your cardiac catheterization, you will walk back to your room.

True False Don't Know

12. You will stay flat in bed until you are told you can get up.

True False Don't Know____

13. After your cardiac catheterization, you will be able to eat and drink.

True_____ False____ Don't Know_____

14. You should report any signs of coldness, numbress, or bleeding in your arm or leg.

True False Don't Know

15. After the cardiac catheterization, it is normal for your arm and leg to become cold and numb.

True False Don't Know

16. You will be in the hands of a well-trained team for your cardiac catheterization.

True_____False____Don't Know_____

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QUESTIONS TO ASK MY DOCTOR

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QUESTIONS TO ASK MY NURSE

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APPENDIX I

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PRETEST-POSTTEST QUESTIONNAIRE

(Extraction of Review Questions from Educational Booklet "You and Your Cardiac Catheterization")

Name	
Age_	Sex
Race	Marital Status
Educa	ationOccupation
Insti	ructions: Place a check mark (/) in the appropriate space for each of the following statements. Please answer every question.
l.	The heart is a muscle located in the middle of your chest and is about the size of a man's fist.
	True False Don't Know
2.	Your heart pumps blood through veins to all parts of your body.
	True False Don't Know
3.	The heart normally beats from 60 to 90 times each minute.
	True False Don't Know
4.	Coronary arteries can become blocked and cause heart disease and chest discomfort.
	True False Don't Know
5.	Blood normally travels through the chambers of your heart in \underline{two} directions.
	True False Don't Know

6. There are values in your heart which are like one-way doors controlling the flow of blood through your heart.

True____ False Don't Know

7. A cardiac catheterization is a diagnostic procedure.

True____ False Don't Know

 Cardiac catheterization means passing a catheter, which is a long, thin, hollow, flexible tube, into your heart through a large vein or artery in your arm or leg.

True_____ False____ Don't Know

 Before your cardiac catheterization, certain blood tests, a chest x-ray, and an EKG (electrocardiogram) will be done.

True False Don't Know

10. You may eat a big meal 1 hour before your cardiac catheterization.

True False Don't Know

11. Your cardiac catheterization is done in a special room called the cardiac catheterization laboratory ("cath" lab).

True False Don't Know

12. Doctors <u>always</u> use the groin area when doing a cardiac catheterization.

True False____ Don't Know_____

13. You will be asked to move around on the table to take x-ray pictures and movies of your heart.

True_____ False____ Don't Know_____

14. You will be awake during the cardiac catheterization.

True False Don't Know
15.	You will be asked to help during the catheterization by taking a <u>deep</u> breath and holding it, and by								
	True False Don't Know								
16.	You may feel hot and uncomfortable when the dye is injected but this feeling will pass quickly.								
	True False Don't Know								
17.	Right after your cardiac catheterization, you will walk back to your room.								
	True False Don't Know								
18.	You will stay <u>flat</u> in bed until you are told you can get up.								
	True False Don't Know								
19.	After your cardiac catheterization, you will be able to eat and drink.								
	True False Don't Know								
20.	You should report any signs of coldness, numbness, or bleeding in your arm or leg.								
	True False Don't Know								
21.	After the cardiac catheterization, it is <u>normal</u> for your arm and leg to become cold and numb.								
	True False Don't Know								
22.	You will be in the hands of a well-trained team for your cardiac catheterization.								
	True False Don't Know								

APPENDIX J

TABLE	8
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COMPILATION OF SUBJECTS' DATA

Subject	Age in Years	Sex	Race	Education in Years	Occupation	Marital Status	Pretest	Posttest
ı,	26	Male	Negro	12	Skilled/Semi-skilled	Widower	16	18
2	45	Male	Negro	15-1/2	Professional	Divorced	14	. 22
3	60	Male	Caucasian	6	Skilled/Semi-skilled	Married	5	18
4	38	Male	Caucasian	12	Business	Married	17	19
5	63	Male	Caucasian	14	Skilled/Semi-skilled	Married	15	20
6	51	Male	Caucasian	15	Retired/Disabled	Married	18	22
7	71	Male	Caucasian	6	Retired/Disabled	Married	2	12
8	50	Male	Caucasian	16	Rancher	Married	13	20
9	50	Male	Caucasian	7	Skilled/Semi-skilled	Married	11	20
10	68	Male	Negro	9	Retired/Disabled	Married	8	15
11	56	Male	Caucasian	12	Skilled/Semi-skilled	Married	18	20
12	44	Male	Negro	16	Retired/Disabled	Separated	15	20
13	45	Male	Negro	12	Unskilled	Divorced	2	20
14	63	Male	Caucasian	8	Unskilled	Married	10	13
15	53	Male	Caucasian	10	Skilled/Semi-skilled	Married	13	22
16	53	Male	Caucasian	12	Retired/Disabled	Married	5	19
17	31	Male	Caucasian	12-1/2	Skilled/Semi-skilled	Divorced	18	22
18	59	Male	Caucasian	10	Retired/Disabled	Married	9	21
19	62	Male	Caucasian	19	Professional	Married	14	20
20	58	Male	Caucasian	12	Retired/Disabled	Married	15	20
21	50	Male	Caucasian	12	Retired/Disabled	Married	7	19
22	65	Male	Caucasian	8	Retired/Disabled	Married	19	20
23	60	Male	Caucasian	12	Retired/Disabled	Married	15	22
24	58	Male	Caucasian	11	Retired/Disabled	Married	18	20
25	46	Male	Caucasian	11	Skilled/Semi-skilled	Married	9	15

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