

## INFORMATION TO USERS

The most advanced technology has been used to photograph and reproduce this manuscript from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

**The quality of this reproduction is dependent upon the quality of the copy submitted.** Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

# U·M·I

University Microfilms International  
A Bell & Howell Information Company  
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA  
313/761-4700 800/521-0600



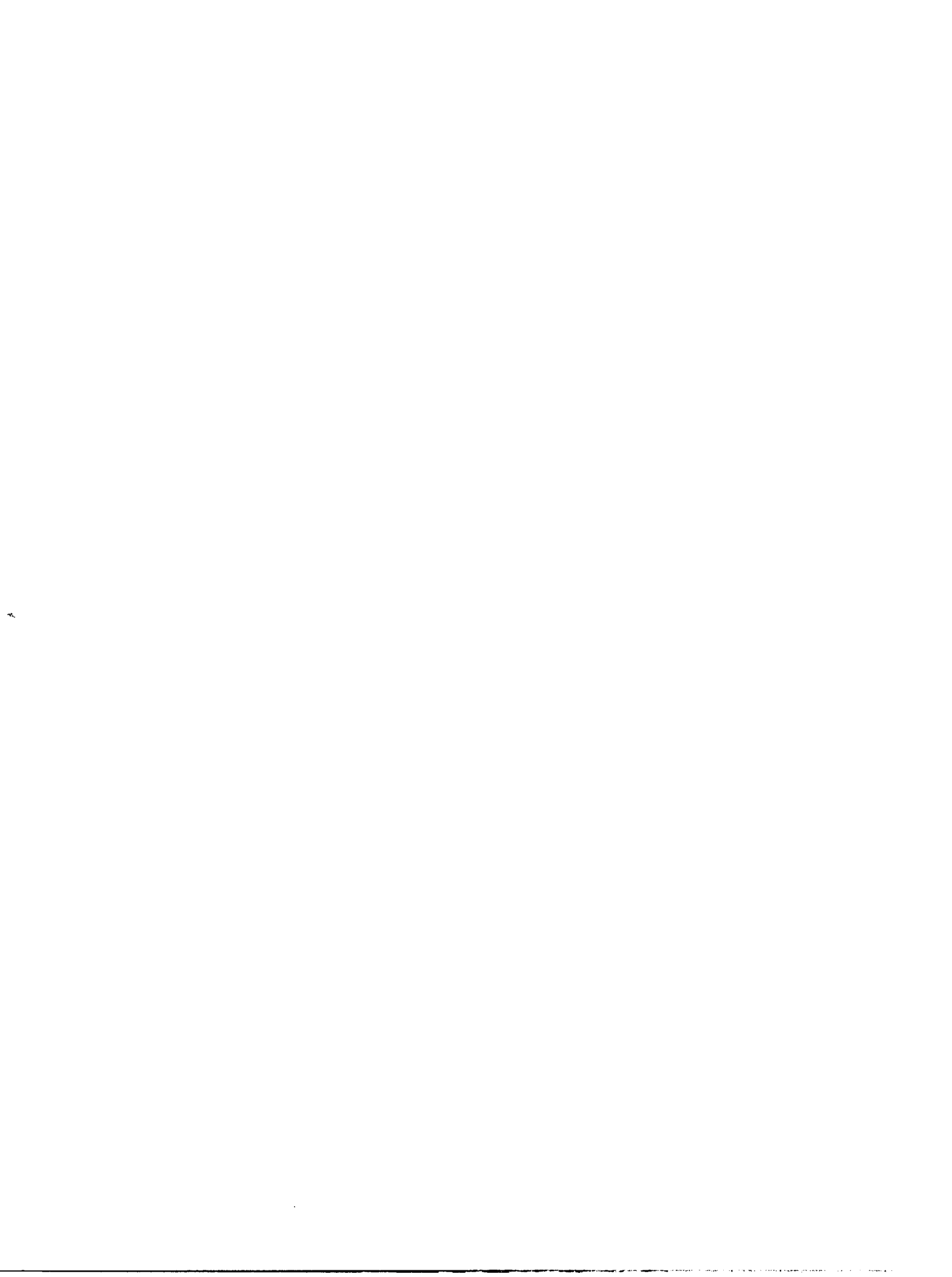
**Order Number 1339906**

**The effect of a percutaneous transluminal coronary artery  
education booklet on patients' knowledge**

**Snyder, Sharon Lea, M.S.**

**The University of Arizona, 1990**

**U·M·I**  
300 N. Zeeb Rd.  
Ann Arbor, MI 48106



THE EFFECT OF A  
PERCUTANEOUS TRANSLUMINAL CORONARY ARTERY EDUCATION BOOKLET  
ON PATIENTS' KNOWLEDGE

by  
Sharon L. Snyder

---

A Thesis Submitted to the Faculty of the

COLLEGE OF NURSING

In Partial Fulfillment of the Requirements

for the Degree of

MASTER OF SCIENCE

In the Graduate College

THE UNIVERSITY OF ARIZONA

1 9 9 0

## STATEMENT BY AUTHOR

This thesis has been submitted in partial fulfillment of requirements for an advanced degree at the University of Arizona and is deposited in the University Library to be made available to borrowers under rules of the Library.

Brief quotations from this thesis are allowable without special permission, provided that accurate acknowledgment of source is made. Requests for permission for extended quotation from or reproduction of this manuscript in whole or in part may be granted by the head of the major department of the Dean of the Graduate College when in his or her judgment the proposed use of the material is in the interests of scholarship. In all other instances, however, permission must be obtained from the author.

SIGNED: Shawn L Snyder

## APPROVAL BY THESIS DIRECTOR

This thesis has been approved on the date shown below:

Rose M. Gerber  
ROSE GERBER  
Associate Professor of Nursing

4-26-90  
Date

### ACKNOWLEDGMENTS

The encouragement and inspiration from many special people have made the completion of this thesis possible. I am very grateful to many educators within the College of Nursing, especially Dr. Rose Gerber my thesis chairperson. I would also like to thank Dr. Anne Woodtli and Dr. Suzanne Van Ort, members of my thesis committee for their time and guidance. A special thanks to Dr. Carolyn Murdaugh for her support and inspiration throughout the Master's program.

I wish to acknowledge my family for their infinite support and encouragement in helping me grow to my fullest potential. A special thanks to my mom for her boundless love and inspiration, and my husband Mark for his support during this endeavor.

## TABLE OF CONTENTS

	Page
LIST OF TABLES.....	7
LIST OF ILLUSTRATIONS.....	8
ABSTRACT.....	9
CHAPTER	
1. INTRODUCTION.....	10
Statement of the Problem.....	11
Significance of the Study.....	12
Statement of the Purpose.....	14
Hypothesis.....	15
Summary.....	15
2. CONCEPTUAL FRAMEWORK AND REVIEW OF THE LITERATURE.....	16
Patient Education.....	18
PTCA education.....	23
"PTCA--A Patients' Guide" booklet...	26
Patient Knowledge.....	27
PTCA knowledge.....	31
Knowledge questionnaire.....	33
Relationship between Patient Education and Knowledge.....	33
Summary.....	34
3. METHODOLOGY.....	36
Research Design.....	36
Sample and Setting.....	39



Protection of Human Subjects.....	40
Method of Data Collection.....	41
Data Collection Instruments.....	42
Data Collection Sheet.....	42
PTCA Knowledge Questionnaire.....	43
PTCA Booklet Evaluation.....	44
Data Analysis Procedure.....	45
Summary.....	46
4. PRESENTATION AND DATA ANALYSIS.....	47
Sample Characteristics.....	47
Questionnaire Reliability.....	53
Difference in Knowledge Scores.....	55
Evaluation Questionnaire.....	57
Summary.....	61
5. DISCUSSION OF RESULTS.....	63
Introduction.....	63
Findings.....	64
Relationship of Findings to Conceptual Framework.....	67
Limitations.....	67
Implications.....	68
Recommendations.....	69
Summary.....	70

APPENDIX A: HUMAN SUBJECTS APPROVAL.....	71
APPENDIX B: SUBJECT DISCLAIMER FORM.....	74
APPENDIX C: DATA COLLECTION SHEET.....	76
APPENDIX D: PTCA KNOWLEDGE QUESTIONNAIRE.....	78
APPENDIX E: PTCA-BOOKLET EVALUATION.....	81
LIST OF REFERENCES.....	83

## LIST OF TABLES

TABLE	Page
1. Demographic Characteristics of the Sample.....	48
2. Sample Characteristics Related to Gender and Information Source.....	51
3. Spearman-Brown Reliability Estimates of the Knowledge Questionnaire.....	54
4. Pair-Wise Correlation Coefficients for Parallel Items: PTCA Knowledge Questionnaire.....	56
5. Summary Table of the t-Test for Differences Between the Control and Experimental Groups...	56
6. Correct Item Responses for the PTCA Questionnaire.....	58
7. Responses on the Evaluation Questionnaire.....	60

## LIST OF ILLUSTRATIONS

FIGURE	Page
1. Conceptual Framework.....	17
2. Post-Test Only Control Group Design.....	37

## ABSTRACT

The purpose of this study was to determine if a written patient education booklet would produce an increase in knowledge of adult participants. Thirty subjects were admitted to this quasi-experimental, post-test only study. Subjects in the experimental group (n=16) were given a patient education booklet, "PTCA--A Patients' Guide", before angioplasty and an Evaluation Questionnaire after angioplasty. Both groups were given a Knowledge Questionnaire after angioplasty.

The Student's t-test of independent group means resulted in a non-significant t-value. No difference in knowledge test scores was found between patients who received the booklet and patients who did not receive the booklet. Results from the evaluation questionnaire suggest that subjects perceived the booklet and pictures to be helpful as preparation for angioplasty. Therefore, revision of the PTCA Knowledge Questionnaire and refinement of the study design is suggested.

CHAPTER 1  
INTRODUCTION

Emerging societal trends such as changing demographics, required cost-containment, consumer expectations of self help and increasing emphasis on professional nursing accountability are accelerating the need for patient education. The demographics of the current population have changed vastly in the last thirty years. A greater proportion of the population over sixty years of age now have longer life spans and are afflicted with chronic diseases without a cure, including coronary artery disease.

Coronary artery disease is a significantly complex chronic disease which has a profound impact on the life-style of the individual. Until recently, treatment of this disease process was limited to drug therapy or coronary artery bypass grafting (CABG). Since 1977, percutaneous transluminal coronary angioplasty (PTCA) has evolved as a therapeutic option. The angioplasty procedure involves the use of a double-lumen balloon catheter to dilate stenosed coronary arteries (Loan, 1986).

Many patients are admitted to the hospital hours before the PTCA procedure, unaware of the coronary artery disease

process and the technical aspects of angioplasty. Without the technical information patients view angioplasty with apprehension (Shillinger, 1983). After angioplasty, and before discharge, is the ideal time for nurses to provide patient education with emphasis on the cause of coronary artery disease. Very little change in life-style is anticipated by patients who do not realize the cause of their disease.

In this study the effects of a structured education booklet given to patients before the procedure were examined. The patient education booklet was designed to increase patient knowledge of specific aspects of coronary artery disease process and the angioplasty procedure.

#### Statement of the Problem

Patients admitted to the hospital for coronary angioplasty may be critically ill or they may be undergoing a less urgent, elective procedure. Regardless of the urgency, only a very short time is available for patient pre-procedural teaching in the hospital. Since nurses are at the patient's bedside from time of admission, nurses have an opportunity to provide patient education to patients before angioplasty. Nurses have knowledge of coronary artery disease and the procedure, have continuity of patient contact, and are able to

answer questions and provide support to the patient and family.

An important principle in all pre-operative education is not only to teach patients but to make sure patients learn the material before the procedure. Many patient education programs use written material with descriptive pictures to facilitate the teaching-learning process. However, few patient education materials are available that are related specifically to coronary angioplasty. The available tools often require more than one item (booklet) per patient and may be cost prohibitive to many institutions.

PTCA--A Patient's Guide, was a booklet specifically prepared for patients about to experience the angioplasty procedure (Snyder, 1987). In the booklet coronary artery disease and the angioplasty procedure are described. Information concerning the expectations of the patient and post-procedure events were included to aid patient reporting of symptoms and complications. The booklet has been used at a local hospital for patient education pre-angioplasty. To date, patients receiving this booklet have not been evaluated to determine if the knowledge objectives have been met.

#### Significance of the Study

The establishment of patient education as a therapeutic



service with adequate standards of care is important for nursing (Redman, 1978). Nurses are viewed as primary health teachers because of the nurse's: a) knowledge of matters related to health, b) opportunity to teach, and c) ability to individualize the teaching and make it relevant to clients (Narrow, 1979). Nurses are responsible for initiating PTCA teaching when the patient is admitted to the hospital and answering questions as they arise. Since the patient is usually admitted to the hospital less than twenty-four hours before the angioplasty procedure, it is important that he or she receive the most useful information about the procedure in the shortest period of time. Any lack of knowledge must be identified and patient questions answered before the procedure.

Planned and supportive nursing interventions for PTCA patients and their families may lead to decreased distress before, during and after angioplasty (Shillinger p.48, 1983). In order to lessen patient distress nurses need a planned educational strategy. An effective teaching-learning program requires planning, teaching tools and evaluation. Evaluation of teaching tools helps to justify the tool and identify weaknesses in the program (Frank-Stromborg, 1985). Evaluation is facilitated when the goals for the program are precise, measurable and objective. The behavioral objectives of the program serve as the basis for evaluating cognitive skills,

psychomotor skills and attitudes (Frank-Stromborg, 1985).

The purpose of preoperative education is to increase patient knowledge and comprehension. Although nurses provide verbal information as a part of daily nursing care, audiovisual materials are often necessary to aid patient comprehension of diagnostic procedures. A planned information guide is helpful in providing consistent instruction and increasing patient knowledge.

#### Statement of the Purpose

The purpose of this study was to determine if a written patient education booklet effected an increase in knowledge of participants. The underlying hypothesis of this study was that there was no difference in knowledge test scores between experimental and control subjects.

The research questions this study was designed to answer were: Will PTCA patients who receive the PTCA--A Patient's Guide booklet score higher on the knowledge questionnaire than patients who do not receive the booklet? Knowledge is defined as the extent to which a patient recalls information received during instruction. A secondary or additional question was: What are the patients' opinions about the nature and completeness of the booklet?

### Hypothesis

This quasi-experimental study was designed to test the null hypothesis that there was no difference in knowledge test scores between experimental and control subjects. Experimental and control subjects were expected to receive usual or routine verbal information from nurses and physicians.

### Summary

The introduction, significance of the problem, statement of purpose and null hypothesis were presented in Chapter 1. Patient teaching is an essential nursing role. As an aid for nurses in teaching PTCA patients, an educational booklet was developed to provide information about coronary artery disease and angioplasty. This study was designed to determine if there was any difference between the experimental and control groups total score on the knowledge questionnaire.

CHAPTER 2  
CONCEPTUAL FRAMEWORK AND  
REVIEW OF THE LITERATURE

The conceptual framework for this quasi-experimental study is pictured in Figure 1. The components of the framework are related to patient education and patient knowledge as they pertain to the PTCA procedure. This chapter includes a review of the literature related to the conceptual framework.

The vertical linkages in the conceptual model propose validity links among the construct, concept, and operational levels. Horizontal lines suggest causal linkages. That is, at the operational level it is hypothesized that reading the PTCA--A Patient's Guide will positively impact on performance on the PTCA Knowledge Questionnaire.

Patient education is discussed as a more abstract construct, followed by PTCA patient education at the concept level, and the booklet PTCA--A Patient's Guide at the operational level. The construct of patient knowledge is discussed next, followed by the concept of PTCA knowledge, and the PTCA Knowledge Questionnaire at the operational level.

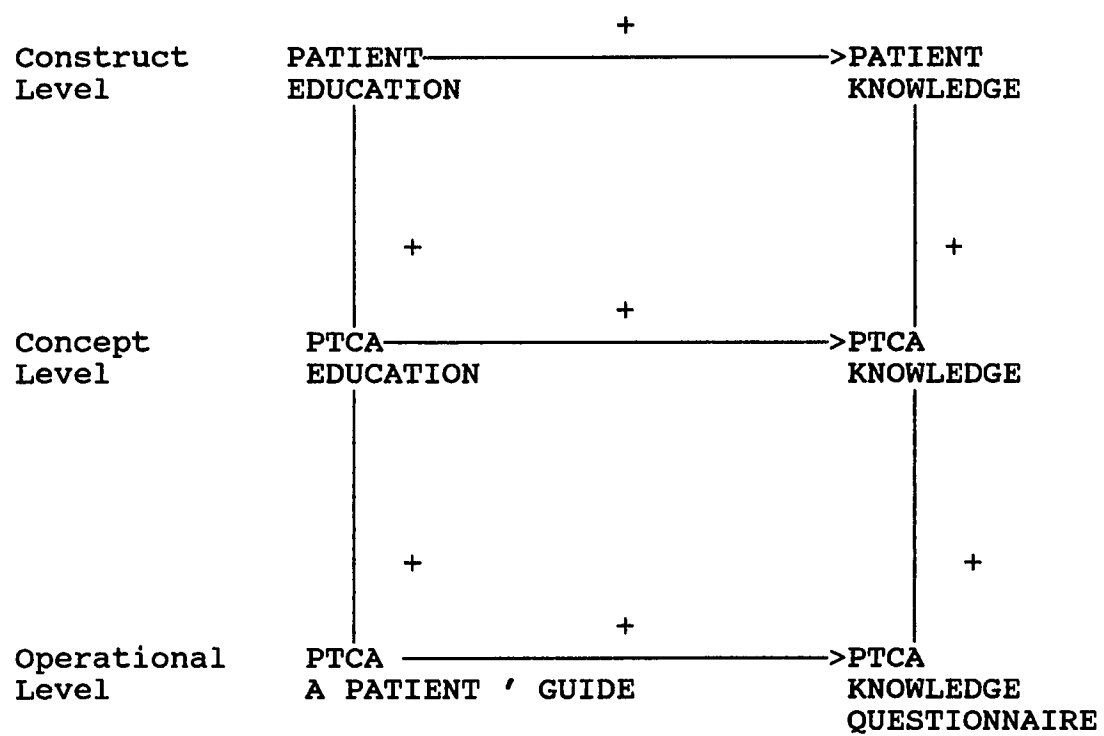


Figure 1. Conceptual Framework

### Patient Education

Patient education is the process of informing patients and their families about the illness, treatment, and other health-related matters (Bartlett, 1984). The purpose of patient education is to teach the patient new concepts and skills in order to produce changes in patient knowledge, attitudes and skills required to maintain and improve health (Levin, 1978, Simonds, 1979). Education enables patients to assume control over their own health.

Since 1972 when the American Hospital Association (1972) published the Patients Bill of Rights, there has been a rapid increase in concern for patient education. The increasing incidence of chronic disease, as well as longer life spans, shorter hospital stays and consumer demands have focused more attention on patient education. Consumer expectations are depicted as moving away from short-term planning to long-term planning and from institutional reliance to self-reliance (Naisbitt, 1982). Consumers understand that knowledge about illness and medical care is not the exclusive property of health professionals (Parker, 1983). People are becoming more interested in self-help or "taking responsibility for health habits, environment, and life-style, and ...demanding to be treated wholistically" (Naisbitt, 1982, p.133). This idea is

synchronous with the health care movement which emphasizes education and self care.

Since the Diagnostic Related Groups (DRGs) prospective payment system was implemented in 1983 to control health care costs, patients are discharged from the hospital earlier and sicker (Sinclair, 1985). In order to prevent complications of the illness and hospital readmission, patients and families need effective health care teaching. They need to know how to prevent recurrences of the disease process and how to care for themselves on a long term basis.

The need for patient education is evidenced by several studies that show patients benefit from relevant learning. Wilson-Barnett and Osborne's (1983) study of 112 patients undergoing a specific patient education program, found that enhanced understanding often relates to persistence and compliance with therapeutic regimens, appropriate use of health services, decreased anxiety, reduced hospitalization time, and the assumption of a more active role in self-care.

Rice and Johnson (1984), using a sample of 130 presurgical cholecystectomy and herniorrhaphy patients, showed a positive effect of specific instruction on exercise behaviors. In their study, the experimental interventions were: 1) no preadmission information, 2) specific preadmission instructions, and 3) general surgical preadmission instructions. They found that the two groups that received

information scored significantly higher in the exercise behaviors than the patients receiving no information. Also, the group with specific instruction performed significantly better than the general instruction group.

The responsibility for teaching and educating the patient as an essential component of patient care currently lies with nursing (Benbow Plewes 1984; Cafferella 1984; Narrow 1979; Redman 1984; Woody, Ferguson, Robertson, Nixon, Blocker, McDonald 1984). As early as 1918, the National League for Nursing Education noted the importance of preparing nurses for teaching tasks; in 1937 and 1950 further emphasis was given to the place of teaching in nursing (Billie, 1981). The issue of responsibility for appropriate health education was delegated to the nurse who spends more time with the patient and is in a position to assess his education needs and his readiness to learn (Narrow 1979). Caffarella (1984) found that other health professionals agreed that nurses should have primary responsibility for planning and execution of patient education programs.

The rapid technological advances in health care indicates a greater need for patient education. Unfortunately, obstacles to patient education cause teaching to be delivered in a sporadic and inconsistent manner (Sinclair; 1985). These obstacles include lack of time, lack of allocated resources, nurses' uncertainty with teaching, varying degrees of useful



knowledge about the subject, and a perception that time spent in this endeavor is not valued by management (Sinclair 1985; Woody et al. 1984).

Nurses must know what to teach, when to teach, and how to teach. The elements of patient education include: 1) assessing the learning needs and readiness of clients, 2) a plan for meeting individual educational needs, 3) educational content that can be documented, and 4) a means for evaluating the effectiveness and cost of teaching (Benbow-Plewes, 1984; Foster 1985; Miller, 1985; McHatton, 1985).

McHatton (1985) reviewed a model used by a Cardiac Rehabilitation Program in order to determine patient readiness to learn. The model is based on Lee's (1970) stages of emotional reaction to trauma and Maslow's hierarchy of needs.

Effective teaching can begin when the stage of acknowledgment is present. This stage is recognized by patient questions, request for explanations or acknowledged change in body image.

When choosing educational materials it is necessary to determine if they are appropriate for patients. Frank-Stromborg (1985) suggested conducting a needs assessment in order to properly identify written material that is available or determine the need to develop materials. When using existing material it is important to know how the material evolved, the reading level design, the objectives and whether or not the objectives were evaluated by a group of

patients (Frank-Stromborg, 1985). Often, written educational materials are rendered useless if they are not aimed at the reading level of the audience they were intended for. A study conducted by Glazer-Waldman, Hall and Weiner (1984) found that 40% of their sample of 100 subjects could read only at the 6th grade level. Another study (Meade & Byrd, 1987) indicates that written materials should be designed for sixth grade reading since people do not necessarily read at the grade completed in school. Miller (1983) also stated that people do not necessarily read at the level of their completed education and suggested that materials be written at the eighth-grade level or lower.

Using cost/benefit analysis, Karam, Sundre and Smith (1986) demonstrated the ability of a patient education program to contain both patient and societal healthcare costs. There were fewer complications with the patients in the experimental group who received the formalized educational program. After calculating the cost of complications between the two groups and the cost of the educational program, they found that the benefits of the patient educational program outweigh the costs: \$574.00 for complications versus \$75.00 for the educational program.

A review of the literature indicates that a formalized patient education program implemented by the nurse at the bedside could prevent sporadic, inconsistent instructional

patterns (Benbow-Plewes, 1984; Caffarella, 1984; McHatton, 1985; Stanton, 1985). A patient education program supported by administrators and physicians can enable nurses to give patient education the priority it deserves. With an increased knowledge base, the patient should be able to participate in self-care, prevent complications, and take charge of his own environment and life-style.

#### PTCA Education

PTCA patient education needs upon hospital admission are quite acute. This procedure is new and relatively unfamiliar and the literature contains very few articles concerning PTCA education. Many authors have described the procedure itself and what nurses need to know. Of the few that recognize the need for patient education, all agree that the intervention must be short and concise due to the lack of pre-procedure time (Lanoue, Snyder, Galan, 1986; Loan, 1986; Ott, 1982; Partridge, 1982).

Loan (1986) indicates four topics appropriate for pre-PTCA instruction are: 1) process of coronary artery disease, 2) risk factor modification, 3) events of PTCA intervention, and 4) routine postoperative care for patients undergoing bypass surgery. Partridge (1982) suggests that the inpatient phase of education contain information on the coronary artery disease process and modes of treatment.

During hospitalization the patient learns that known factors contribute to cardiovascular disease. Although patients have no control over some factors, there are personal and environmental factors which can be altered: stress, body weight, smoking, sedentary life-style, diabetes, and hypertension.

The events of PTCA intervention are very technical. The patient needs a general idea that a catheter will be passed from an artery in his groin to his heart. On the catheter is a balloon that the doctor will inflate to flatten the lesion in the coronary artery. The most important part of this explanation is to inform the patient of the tactile stimulation involved in the procedure. These factors include the coldness of the x-ray room, possible chest discomfort when the balloon is inflated, a hot flushed feeling when the dye is injected, and restriction of arm movement. Patients informed of these sensations cooperate more in the cardiovascular lab when the physician is performing the procedure (Loan, 1986).

Patients also need to know that a small percentage of patients undergoing PTCA require emergency coronary artery bypass grafting (CABG) due to restenosis and coronary dissection (Ott, 1982; Loan, 1986). Brief instruction about possible bypass surgery including use of the endotracheal tube, chest tubes, general postoperative routines, activity progression, and incisional areas, is necessary (Purcell &

Griffin, 1981).

This information combined with the uncertainty of angioplasty success may cause increases in patient anxiety and emotional stress (Shillinger, 1983). Anxiety may also be caused by a perceived threat of loss of usual health status or life-style, fears of the unknown related to the procedure and loss of personal control (Purcell & Griffin, 1981).

Fear of the unknown causes an increase in the psychophysiologic stress response. However, "information sharing [teaching] serves to minimize the patients subjective experience of stress" and "it also minimizes objective physiologic fluctuations" (Shillinger, 1983, p.48) which may cause intra-procedural problems. The result of sympathetic nervous system stimulation from stress may result in, "inaccurate measurements of intracardiac pressures, flow rates, oxygen saturation, and tachyarrhythmias" (Shillinger, 1983, p.48). Planned nursing intervention can help to decrease this anxiety throughout the hospital stay (Shillinger, 1983; Loan, 1986).

Teaching the patient about angioplasty, the cause of heart disease and risk factors are appropriate goals for a short hospital stay. However, patients do not learn how to decrease their risk of further heart disease in this short period of time and should be referred to cardiac rehabilitation for long-term compliance of life-style changes

(Lanoue, Snyder, & Galan, 1986).

#### PTCA--A Patients' Guide

The PTCA--A Patient's Guide (Snyder, 1987) is an education booklet written for patients undergoing PTCA. The booklet was developed at the request of a local hospital needing individualized and cost-effective PTCA education material. The content was developed from interviews of patients before and after PTCA and a group of professional persons involved with cardiology. The hospital requested: 1) material that could be understood by patients, 2) material that could be photocopied, and 3) material that could be altered to patients' educational needs. The booklet was designed to inform patients and family about coronary artery disease, risk factors, PTCA and the recovery period. The objectives of the PTCA--A Patients' Guide booklet are designed to provide that, upon completion of the booklet, patients will know that:

1. coronary artery disease is the leading health problem in the United States.
2. the cause of anginal pain is the lack of oxygen to the heart muscle.
3. a build up of cholesterol is the cause of narrowing in the coronary artery.
4. the purpose of PTCA is to flatten the plaque in the

coronary artery and increase the blood supply to the heart muscle.

5. the purpose of blood thinning drugs is to prevent clots from forming in the coronary artery at the PTCA site.
6. the importance of reporting any symptoms to healthcare professional is to prevent complications from coronary artery spasm during and after the PTCA.
7. the purpose of leaving a catheter in the groin for 24 hours after the PTCA is for monitoring and easy access for emergency repeat PTCA.
8. the doctor should be notified immediately of chest pain unrelieved by rest or nitroglycerin.
9. the patient should report to an emergency room immediately for unrelieved chest pain after discharge from the hospital.

### Patient Knowledge

Knowledge is defined as the extent to which a patient recalls information received during instruction or learned information (Stanton, 1985). Learning can be defined in Latin as an educational process of "drawing out" (Griffiths, 1987) and may be considered a change in "insights, behavior,

perception or motivation, or a combination of these" (Bigge, 1982, p. 274). Thus, learning is a change or "reorganization of insights, knowledge, skills, attitudes, values, or expectations" (Bigge, 1982, p. 274). Until recently, learning theorists devoted their interests on childhood and adolescent learning. In the last two decades more studies on adult learning have been published in the literature. The adult years, previously marked by a period of life in which little intellectual development occurred, has evolved into a period of adult learning based on an alternative perspective called 'life-span development psychology' (Keeley Robinson, 1986). This view demonstrates that developmental change does not stop at a specific stage but progresses on a horizontal continuum. Instead of viewing adult learners as being beyond intellectual development and as retaining fixed knowledge, they may be viewed as persons with learning potential.

--the term "adult education" denotes the entire body of organized educational processes, whatever the content, level and method, whether formal or otherwise, whereby persons regarded as adult by the society to which they belong develop their abilities, enrich their knowledge, and bring about changes in their attitudes or behavior (Knowles, 1973. p.267).

Theories of learning were limited to the education of children and young adults, called the pedagogical model of learning (Knowles, 1984). This model uses the same educational process, adapted to all ages, in the design for learning. Humanistic psychologists acknowledged the specific



needs of the adult learner. Their view had a different approach to teaching adults and was termed 'andragogy' (Knowles, 1984). This theory assumes:

1. Adults should be self-directed learners. This theory assumes as a person matures, he moves away from total dependency to increasing self-directedness (Knowles, 1984). At the point in which an individual achieves self-direction he psychologically becomes an adult.
2. The teacher is a facilitator and directs the adult learner which is consistent with the mature self-concept. They are co-partners in the learning process, adult learners are involved in decision making, have access to information and have the right to discuss positively or negatively with views that are expressed (Keeley Robinson, 1986). The teacher fosters the active involvement of acquiring information and contrasting new information with experience.
3. Learners have an expanding reservoir of experience which becomes a core for learning and provides a base to which to relate new learning. The theory of andragogy promotes discussion, laboratory

simulation, field experience, team projects, and other action-learning techniques. In this manner the learner becomes a resource for other learners because of his experience (Knowles, 1984).

4. Learners are ready to learn things they 'need' to know because of the developmental role they are facing. When learners identify their own learning needs they become more involved in the discovery of knowledge which allows more meaningful learning (Keeley Robinson, 1986). The critical factor of this assumption is to coincide learning experiences with the learners' developmental tasks (Knowles, 1984).
5. Learners, as adults, tend to have a problem-centered orientation to learning due to their here-and-now needs instead of future needs. The adult seeks knowledge due to some inadequacy with current life problems and seeks immediacy of application (Knowles, 1984).
6. Learners set their own goals and continually evaluate their own learning. The educator encourages learners to assess their own progress

according to individual objectives. The educators evaluation exists only as a mechanism of descriptive feedback.

The nature of learning is an internal rather than external process which is controlled by the learner (Keeley Robinson, 1986). Therefore, the teacher becomes a partner in the learning process. The humanistic approach assumes the learner will assume responsibility for his own learning, establish individual learning goals which can be modified with experience. From these basic assumptions of adult learning, application of these concepts to the acquisition of knowledge about the PTCA procedure is presented.

#### PTCA Knowledge

PTCA knowledge is the accurate cognitive recall of the technical aspects of PTCA, the significance of the results, the names of medications and specific side effects (Lanoue, Snyder, & Galan, 1986).

According to andragogy theories, the PTCA learning situation consists of mature adults, who are self-directed learners. They realize that they lack information about PTCA and focus their energy to learning about the procedure.

The educator provides educational materials to facilitate learning about PTCA. At this point the learner takes responsibility for learning. The educator also tries to

relate this new information to the patient's past experience.

Patients may have some knowledge base concerning heart disease from relatives, friends, health professionals or significant others. This base of experience should allow incorporation of new knowledge. Learning about PTCA in a small group enables other learners to share past knowledge and increases learning.

Patients should be able to identify an inadequacy of knowledge about PTCA. At the time of admission to the hospital, they are ready to become involved in learning and the information will be more meaningful. A patient more readily learns information he is seeking about PTCA when initially hospitalized, rather than learning information about altering the process of coronary artery disease. Faced with a critical procedure patients need to learn about the immediate problem before they are ready to learn about future rehabilitation.

The patient decides what he needs to know about PTCA and will omit information unimportant to his goal. Before PTCA, the educator should encourage the patient to set goals concerned with PTCA and the recovery period. During the recovery period the patient may alter his goals to increase learning about coronary artery disease, risk factor modification and rehabilitation.

### PTCA Knowledge Questionnaire

The concept of PTCA knowledge was operationalized through the use of PTCA Knowledge Questionnaire. The knowledge questionnaire, as a measure of PTCA knowledge, was designed to test the cognitive objectives of the booklet to determine if a knowledge gain had occurred from reading the booklet. This questionnaire is discussed in more detail in the next chapter.

### Relationship between Patient Education and Knowledge

At the more abstract construct level, patient education has a positive axiomatic effect on patient knowledge (Mills, Barnes, Rodell and Terry, 1985; Shillinger, 1983). Mills, Barnes, Rodell and Terry (1985) support a direct relationship between patient education programs and specific knowledge gain. Their randomized study examined the roles of: 1) patient knowledge, 2) demographic information, 3) general intelligence and problem-solving ability, and 4) dysfunctional behavior of patients with ischemic heart disease recently discharged from a cardiac patient education program. To assess knowledge, 342 participants were given a paper-and-pencil, 23-item, multiple choice test. One group was assessed for their knowledge of their illness before and after the education intervention. The second group was

assessed only after the education intervention. The authors stated that they unexpectedly found that the first group scored higher on the post test. One conclusion of this result suggests that repeated testing may serve as a motivator for patients to avail themselves of information that will optimize health and well being. Roberts' (1983) study of 1,858 patients showed that clinic visits for upper respiratory infections (URI) were reduced by using a self-care health education program. The author concluded that the families who received education in the experimental group had 44% fewer visits than the control group which received no education. Also, the total URI visits were 29% less in the self-care experimental group. Therefore, the "PTCA--A Patients' Guide" education booklet should increase knowledge as measured by the PTCA Knowledge Questionnaire at the operational level.

#### Summary

Review of the literature indicated the nature of adult learning is an internal rather than external process which is controlled by the learner of which the teacher then becomes a partner. In the humanistic approach, the learner will assume responsibility for his own learning and establish individual learning goals. These individual goals can be modified with experience. Several studies identified an increase in

knowledge scores from teaching interventions. However, one study showed higher scores on the knowledge questionnaire using the pretest--post-test design, suggesting subjects learned from the pretest. The literature revealed that repeated testing may serve as a motivator for patients to avail themselves of information that will optimize health and well being.

### CHAPTER 3

#### METHODOLOGY

The methodology used to test the research hypothesis is presented in this chapter, including a description of the sample and the setting where the study was conducted. The plan for protection of rights of human subjects as well as a description of the data collection instruments, methods of collection and the data analysis plan are discussed.

#### Research Design

A quasi-experimental post-test only control group design (Figure 2) was used to test the null hypothesis that there was no difference in knowledge test scores of patients who received the patient education booklet and of patients who did not receive the patient education booklet. Patients were randomly assigned to either the experimental or control group. The teaching booklet was given to subjects in the experimental group at least six hours before the procedure in an attempt to control for anxiety due to admission activities such as physical examination, blood work, and skin preparation.



	Independent Variable	Dependent Variable
Randomly Assigned Experimental Group	Treatment (Education Booklet)	POST-TEST 1-Knowledge Questionnaire 2-Demographic Questionnaire 3-Booklet Evaluation
Randomly Assigned Control Group		POST-TEST 1-Knowledge Questionnaire 2-Demographic Questionnaire

Figure 2. Post Test Only Control Group Design.

The post-test which consisted of the knowledge questionnaire, demographic questionnaire, and booklet evaluation, was administered to all subjects 24 to 48 hours after the PTCA procedure. The major advantage of the post test-only control group design is that neither experimental nor control group subjects have been pre-tested. Pre-testing may result in test familiarity or test fatigue which could alter post-test results (Burns and Grove, 1987). This situation was documented by Mills et al. (1985) when they reported that their pre-test and post-test group scored significantly higher on the post-test. The authors believed that the group learned from the content on the pre-test and may have asked questions which altered their scores on the post-test.

Control for influences on learning and recall were attempted by not pre-testing either group in the current study, documenting sources of information that were given to the patient concerning PTCA, and limiting the sample to patients undergoing PTCA for the first time. Evidence of a previous angiogram on the patient and/or a previous angiogram or angioplasty on a family member was used as a proxy measure for patient knowledge. The angiogram procedure consists of inserting a catheter into the heart and injecting dye into the coronary arteries to identify plaques. The angioplasty procedure also includes the insertion of a catheter into the

coronary artery, but for the purpose of fracturing a plaque. One disadvantage of the post-test only design is that without pre-testing the patient's knowledge, it is difficult to establish how much PTCA knowledge the patient had before the booklet was given or before the procedure was performed (Burns and Grove, 1987).

### Sample and Setting

The convenience sample consisted of 16 male and 14 female subjects. Subjects were hospitalized adult patients diagnosed with coronary artery disease and about to undergo a PTCA procedure for the first time. The thirty subjects were randomly assigned to either the experimental group (n=16) or the control group (n=14), using a table of random numbers.

Criteria for selection of subjects were:

- 1) the patient would be undergoing PTCA for the first time,
- 2) each patient was able to read and understand English,
- 3) patients did not experience acute pain either pre or post procedure (requiring more than 10 mg of Morphine Sulfate IV or Nitroglycerin drip greater than 1mcg/kg/mn),
- 4) the patient did not have a history of previous

- open-heart surgery,
- 5) the patient did not require open-heart surgery during the same hospital stay,
  - 6) adults aged 18 years or older.

The subjects were assumed to have received some informal information about coronary artery disease or the PTCA procedure from family, friends and health care professionals. Subjects meeting the inclusion criteria and consenting to participate received an explanation of the study via the subject disclaimer. The subjects for the study were hospitalized on a medical unit or coronary care unit pre-procedure and the coronary care unit post-procedure within a university hospital in a large southwestern city. Written permission to conduct the study on these units was obtained from the Director of Nursing Research (Appendix A). Verbal permission to contact potential subjects was obtained from the Nurse Manager of these units.

#### Protection of Human Subjects

The rights of human subjects were protected according to University policy. Permission from the Human Subjects Review Committee of the College of Nursing was obtained (Appendix A).

The investigator contacted patients who met the criteria for admission into the study. The study was explained

verbally and in writing, and with agreement of the subject to participate in the study, subjects were asked to read the disclaimer form (Appendix B). The disclaimer explained that one group was to receive the educational booklet and the time difference for participation in the study was twenty to thirty minutes longer for this group.

Confidentiality of the data was maintained by assigning each participant a code number. These code numbers were used on all questionnaires at the time of data collection and used during data analysis. Participants were informed verbally and in writing that their identities and the information collected was confidential and anonymity would be maintained if the findings were published.

#### Method of Data Collection

Subjects were identified by the investigator from the Angioplasty Standby Schedule in the Cardiothoracic Office. Each subject was then randomly assigned into the experimental or control group. The subjects in the experimental group were approached the evening before the PTCA procedure and invited to participate in the study. Upon agreement, the disclaimer was presented to the subject and the teaching booklet given to the patient with a request to complete the reading before the angioplasty. No other information was given to the subject by

the investigator. Before discharge from the hospital, the subject was approached again and given a packet containing the three questionnaires in random order. Subjects assigned to the control group were approached the day after the PTCA procedure, before discharge from the hospital, and invited to participate in the study. Upon agreement the disclaimer was presented to the subject and two questionnaires were given as a packet in random order. The same method of collection was used for these subjects.

Once the questionnaires were completed by the subject, they were placed back in the envelope and given to the staff nurses for later retrieval by the investigator. Data were collected over a nine month period as subjects were scheduled for angioplasty.

#### Data Collection Instruments

A data collection sheet, a PTCA knowledge questionnaire and a PTCA-booklet evaluation sheet were used to collect information.

##### Data Collection Sheet

The data collection sheet (Appendix D) was designed by the investigator. It consisted of identification of the investigator, the subject code number, group assigned, number

of days since hospital admission, age, sex, cardiac diagnosis, highest education level, previous angiogram, previous angiogram or PTCA by family member, identification of persons giving any PTCA information since admission, time booklet given before the PTCA procedure, date of discharge, date post-test given, and discharge date.

#### PTCA Knowledge Questionnaire

The PTCA knowledge questionnaire (Appendix E) was designed to test knowledge gained from a patient education booklet. Before testing the patient education booklet the reading level was assessed by using the SMOG Readability Formula (Miller, 1985). The booklet was estimated to be written at a tenth grade reading level.

Content validity of the PTCA knowledge questionnaire was established by a panel of three experts, two staff members of a Cardiac Care Unit and the Nurse Manager, using the index of content validity (CVI). The CVI (Waltz, 1981) is a 4-point ordinal rating scale, where 1 equals an irrelevant item and 4 an extremely relevant item. The index is based on the number of items that received a rating of 3 or 4 by the experts. Using the item evaluation, CVI index were calculated for each question and the entire instrument. Each of the eighteen questions rated a three or four from three experts. The experts correctly matched the objective to the question being

asked verifying that the items tested the educational objectives.

Internal consistency of the knowledge questionnaire was estimated for the sample by the Spearman-Brown Split Half test. This test is computed by dividing the questionnaire in half and testing the correlation between the two halves. There was one true-false question and one multiple choice question for each knowledge objective. Since each question had only one correct answer, and the same answer was used for either a true-false or multiple choice question, these two groups were compared by objectives to determine patient knowledge.

#### PTCA Booklet Evaluation

The PTCA-booklet evaluation sheet was an eight item questionnaire which allowed the patient to give his or her opinion of the booklet by using four Likert-type answers which ranged from Strongly Agree (1) to Strongly Disagree (4). This questionnaire was previously tested on eight patients who had received the booklet and undergone PTCA. The scores ranged from very helpful (8) to unhelpful (32). The mean score from the pilot study was 16 which was interpreted as helpful to patients undergoing PTCA.



### Data Analysis Procedure

Initial data analysis was computed on the demographic questionnaire in order to obtain a description of the subjects. In order to test the homogeneity of the knowledge questionnaire, the Spearman-Brown Split Half test was used to divide the instrument and correlate the two halves. The significance level was selected at  $p \leq .05$ . Pearson product-moment correlation coefficients were computed between paired items within the PTCA knowledge questionnaire to determine if they were parallel.

t-Tests (two-tailed) for independent groups were used to determine if there were significant differences between the group mean scores on the Knowledge Questionnaire. A significance level of  $p \leq .05$  was selected. Correct item frequencies were calculated to describe each question individually.

The results of the Evaluation Questionnaire were described by the use of means and standard deviations. In order to make these responses more statistically meaningful, points were assigned to each response; Strongly Agree = 4, Agree = 3, Disagree = 2, Strongly Disagree = 1, except in question three which was reversed due to the negative structure of the question.

### Summary

A quasi-experimental post-test only control group design was proposed to test the null hypothesis that there was no difference in knowledge test scores between experimental and control subjects. Subjects were hospitalized adult patients diagnosed with coronary artery disease and about to undergo a PTCA procedure for the first time. A demographic data sheet, a PTCA knowledge questionnaire and a PTCA-booklet evaluation sheet were utilized to collect information.

CHAPTER 4  
PRESENTATION AND DATA ANALYSIS

The results of this study were based on data from 30 subjects. This chapter includes the demographic data and reliability estimates followed by a presentation of the results of the statistical tests.

Sample Characteristics

Out of 32 consenting participants, two subjects were excluded due to the need for emergency coronary bypass surgery. Therefore, 30 subjects who met the inclusion criteria and who completed the questionnaires comprised the sample for this study. Demographic data of the experimental group (n=16), control group (n=14), and the total sample are described. The average age of the subjects in the experimental group was 65.4 (s.d.= 11.0) years. The mean age of subjects in the control group was 57.6 (s.d.= 12.8) years (Table 1). The mean age of the total sample was 61.8 (s.d.= 12.7) years.

Table 1.  
Demographic Characteristics of the Sample

Characteristics	Experimental Group (n=16)		Control Group (n=14)		Total Group (N=30)	
	$\bar{X}$	s.d.	$\bar{X}$	s.d.	$\bar{X}$	s.d.
Age, in years	65.4	(11.0)	57.6	(12.8)	61.8	(12.7)
Education, in years	13.4	(2.6)	14.5	(3.37)	13.9	(3.0)
Booklet-PTCA hours	24.7	(10.0)	*		*	
PTCA to post-test hours	26.8	(9.9)	24.3	(13.5)	27.2	(11.6)
PTCA-discharge hours	49.8	(15.2)	50.9	(30.1)	50.3	(23.3)

\*Not applicable

The mean education level for the 16 subjects in the experimental group was 13.4 (s.d.=2.6) years. In the experimental group, 3 subjects did not complete high school; 2 completed high school, 6 had some college education, 4 were college graduates and 1 had some post graduate education. The mean education level of the control group was 14.5 (s.d.=3.37) years (Table 1.). Of the 14 subjects in the control group, only one subject did not complete high school; 4 completed high school, 5 had some college education, 2 were college graduates, 1 had some post graduate education, and 1 completed doctoral studies. The mean education level of the total sample (N=30) was 13.9 (s.d.=3.0) years, where 63.3% of the sample had 14 or less years of education.

As shown in Table 1, the experimental group received the booklet a mean of 24.7 (s.d.= 10.0) hours before PTCA. The control group did not receive the patient education booklet. Patients were given the education booklet the evening before the scheduled angioplasty, but frequently the actual time of the procedure was postponed up to 24 hours. This delay caused a wide range of 16 to 57 hours from the time the education booklet was received until the PTCA was performed in the experimental group.

In the control group, the average number of hours between the PTCA procedure and the post-test was 24.3 (s.d.= 13.5) hours; in the experimental group it was 26.8 (s.d.= 9.5)

hours. The post-test was administered to the total sample a mean of 27.2 (s.d.= 11.6) hours following the PTCA procedure.

The experimental subjects were discharged from the hospital an average of 49.8 (s.d.= 15.2) hours after the PTCA. The control subjects were discharged a mean of 50.9 (s.d.= 30.1) hours after PTCA. The total sample of subjects were discharged an average of 50.3 (s.d.= 23.3) hours following PTCA.

As summarized in Table 2, the ratio of males to females in the experimental group consisted of two more males (n=9) than females (n=7). The control group was equal (n=7).

Data from the demographic questionnaire revealed that 12 (75.0%) subjects in the experimental group and 13 (92.9%) subjects in the control group had previous angiography. Therefore, in the total sample, 25 (83.3%) subjects experienced a previous angiogram. Of the experimental group, four (25.0%) subjects reported that a family member had previous angiography. In the control group, two (14.2%) subjects reported a familial history of angiography. Of the total sample, 6 (20.0%) subjects had a family member with a previous coronary angiogram. Due to the similarity of the procedures, learning may have occurred during the earlier angiogram procedure. However, all subjects (N=30) reported a negative family history of previous percutaneous transluminal coronary angioplasty (PTCA). Thirteen (92.9%) subjects

Table 2.  
Sample Characteristics Related to Gender and Information Source

Characteristics	Experimental Group (n=16)		Control Group (n=14)		Total Group (N=30)	
	n	%	n	%	N	%
<b>Gender</b>						
Male	9	(56.3)	7	(50.0)	16	(53.3)
Female	7	(43.8)	7	(50.0)	14	(46.7)
<b>Pre-angiogram</b>						
yes	12	(75.0)	13	(92.9)	25	(83.3)
no	4	(25.0)	1	(7.1)	5	(16.7)
<b>Family angiogram</b>						
yes	4	(25.0)	2	(14.2)	6	(20.0)
no	12	(75.0)	12	(85.7)	24	(80.0)
<b>Family PTCA</b>						
no	16	(100)	14	(100)	30	(100)
<b>Information</b>						
physician	14	(87.5)	13	(92.9)	27	(90.0)
and relative	1	(6.3)	0		1	(3.3)
and friend	1	(6.3)	1	(7.1)	2	(6.7)

reported receiving information only from the physician and one subject received information from the physician and a friend.

In the experimental group, all subjects received the patient education booklet. In addition, fourteen of the subjects from the experimental group reported receiving information only from the physician, one from the physician and relative, and one from the physician and friend. Of the total sample, 90% of the subjects received information only from the physician, 3.3% from a relative and the physician, 6.7% from a friend and the physician.

To summarize the sample characteristics, the average age of all subjects was 61.8 (s.d.=12.7) years, with the experimental group being an average of 7.8 years older than the control group. The average level of education for all subjects was 13.9 (3.0) years, the experimental group having 1.1 years less education than the control group. The experimental group was given the post-test an average of 2.5 hours after the control group. After the PTCA, experimental subjects were discharged from the hospital an average of 1.1 hours earlier than the control subjects.

The experimental subjects were less likely to have had previous angiogram experience than the control group, but more experience with angiograms in family members. All subjects reported receiving information from their physicians.



### Questionnaire Reliability

The knowledge questionnaire consisted of two parallel sections that contained the same questions but with different response options (Appendix D). The first section, questions 1-9, consisted of 9 multiple choice questions in which the subject had a choice of four answers. The second section, questions 10-18, consisted of 9 true/false questions in which the subject had to circle T or F. The second question from the multiple choice section was inadvertently omitted from the questionnaire during word-processing. Therefore the parallel item, question eighteen, was necessarily omitted from the statistical analysis. The remaining 16 questions represented the total questionnaire for analysis.

In order to test the homogeneity of the knowledge questionnaire, the Spearman-Brown Split Half test was used to divide the instrument and correlate the two halves (Kerlinger, 1987). The multiple choice questions (part A) were compared to the true/false questions (part B) at a criterion level of  $r \geq .70$ , which is the accepted range for a newly developed instrument (Kerlinger, 1987). The correlations of the total instrument were not statistically significant with an  $r = .299$  (Table 3). In part A, the multiple choice questions had a higher correlation of .561 and in part B the true/false questions had a correlation of .372.

Table 3.  
Spearman-Brown Reliability Estimates of the Knowledge  
Questionnaire

---

Questions	Correlation Coefficients
PTCA 1- 9 (MC)	.561
PTCA 10-17 (TF)	.372
PTCA 1-17 (Total)	.299

---

MC= Multiple Choice  
TF= True/False

Pearson product-moment correlation coefficients were computed between paired items within the PTCA knowledge questionnaire to determine if they were parallel. The pair-wise correlation coefficients are presented in Table 4. The level of significance was set at  $p \leq .05$ . Four pairs of questions were significantly correlated at the  $p \leq .05$  level and two pairs were not. The correlation coefficient for question 16 could not be computed because all subjects in both groups responded correctly and there was no variance.

#### Difference in Knowledge Scores

In order to determine how each group scored on the Knowledge Questionnaire, the correct responses were summed to obtain a total score. The maximum possible correct responses on the questionnaire was 16; the higher the score, the greater the PTCA knowledge of the subject.

Comparison of group mean scores on the 16-item Knowledge Questionnaire resulted in the experimental group scoring an average of 0.7 higher than the control group (Table 5). The experimental group scored a mean of 13.6 (s.d.= 1.3) and the control group scored a mean of 12.9 (s.d.= 1.7) correct answers. Since the difference between the mean scores was very small, the Student's t-test of independent group means resulted in a non-significant t-value of -1.17 ( $p=.25$ ). Thus

Table 4.

Pair-wise Correlation Coefficients for Parallel Items: PTCA Knowledge Questionnaire

Question # Part A	Question # Part B	r	p
1	12	-.089	.320
2*	18*		
3	10	.523	.002
4	11	.604	.000
5	13	.089	.320
6	16**		
7	14	.485	.003
8	17	-.071	.354
9	15	1.000	.000

\* Omitted

\*\* No Variance; unable to compute r

Table 5.

Summary Table of the t-Test for Difference Between the Control and Experimental Groups

PTCA QUESTIONS	mean	s.d.	F-value	2-tail	Pooled variance t-value	2-tail
Experimental (n=16)	13.6	1.3				
Control (n=14)	12.9	1.7	1.78	.285	-1.17	.250

the null hypothesis that there was no difference in knowledge test scores between the experimental and control subjects was not rejected at the significance level of  $p \leq .05$ .

In order to determine the frequency of correct responses for each question by group, the scores for each question were calculated and are summarized in Table 6. Question number eighteen, the parallel question of question number two, was omitted. The item scores for the experimental group (n=16) ranged from 9 to 16 with a composite total score of 224 (87.5%) of a possible 256 correct responses. Item scores for the control group (n=14) ranged from 3 to 14 with a composite total score of 181 (80.8%) of a possible 224 correct responses.

#### Evaluation Questionnaire

Subjects in the experimental group who received the PTCA--A Patient's Guide booklet were requested to complete an evaluation of the booklet at the time of the post-test (Appendix E). All sixteen of the subjects in the experimental group completed the evaluation questionnaire. The evaluation questionnaire consisted of eight Likert-type questions in which the subject had a choice of four response options ranging from Strongly Agree to Strongly Disagree. In order to make these responses more statistically meaningful, points

Table 6.  
Correct Item Responses for the PTCA Questionnaire (N=30)

PTCA Question # (or item)	Group			
	Experimental (n=16)		Control (n=14)	
	n*	%	n*	%
<b>Part A</b>				
1	15	93.8	13	92.9
2	omitted			
3	15	93.8	12	85.7
4	12	75.0	11	78.6
5	0	0.0	3	2.1
6	13	81.3	13	92.9
7	16	100.0	7	50.0
8	14	87.5	14	100.0
9	15	93.8	14	93.8
<b>Part B</b>				
10	14	87.5	12	85.7
11	16	100.0	11	78.6
12	16	100.0	11	78.6
13	10	62.5	7	50.0
14	16	100.0	12	85.7
15	15	93.8	14	100.0
16	16	100.0	14	100.0
17	15	93.8	13	92.9
18	omitted			

\* Maximum possible correct = group n.

were assigned to each response; Strongly Agree = 4, Agree = 3, Disagree = 2, Strongly Disagree = 1, except in question three which was reversed due to the negative structure of the question. The content of the question was considered beneficial if the subject's mean response was 3 or greater (Table 7).

In question one, all 16 subjects agreed (n=8) or strongly agreed (n=8) that the booklet explained the procedure completely with a mean of 3.5 (s.d.=.52). In question two, all patients agreed (n=10) or strongly agreed (n=6) that the booklet was helpful before the procedure with a mean of 3.8 (s.d.=5.0). The third question had a mean of 2.9 (s.d.=.81) in which 2 subjects strongly agreed that too much information was given in the booklet; the other 14 subjects disagreed (n=12) or strongly disagreed (n=2). In question four, 16 subjects agreed (n=8) or strongly agreed (n=8) that the pictures helped explain the procedure with a mean of 3.5 (s.d.=.52). In the fifth question, 16 subjects agreed (n=7) or strongly agreed (n=9) that they liked the booklet with a mean of 3.6 (s.d.=.51). The sixth question was with a mean of 2.4 (s.d.=.50) in which 6 subjects agreed that the risk factor information was not new and 10 disagreed. The seventh question had a mean of 2.7 (s.d.=.48) in which 11 subjects agreed that the risk factor information would be useful at home and 5 disagreed. In the last question, 16 subjects

**Table 7.**  
**Responses on the Evaluation Questionnaire**

Evaluation			Subject Responses (N=16)							
Question #	x	s.d.	SA n	%	A n	%	D n	%	SD n	%
1	3.5	.52	8	50.0	8	50.0	0	0.0	0	0.0
2	3.8	.50	6	37.5	10	62.5	0	0.0	0	0.0
3	2.9	.81	2	12.5	0	0.0	12	75.0	2	12.5
4	3.5	.52	8	50.0	8	50.0	0	0.0	0	0.0
5	3.6	.51	9	56.3	7	43.8	0	0.0	0	0.0
6	2.4	.50	0	0.0	6	37.5	10	62.5	0	0.0
7	2.7	.48	0	0.0	11	68.8	5	31.3	0	0.0
8	3.4	.51	9	56.3	9	56.3	0	0.0	0	0.0



agreed (n=9) or strongly agreed (n=9) that the booklet was useful for family members that read the booklet with a mean of 3.4 (s.d.=.51). Overall, the subjects agreed that the booklet was helpful with a mean of 3.2 (s.d.=.52).

### Summary

A total of thirty subjects participated in this study. They were randomly assigned to two groups: an experimental group (n=16) and a control group (n=14). Analysis of demographic data revealed that the experimental group was 7.8 years older and had 1.1 years less formal education than the control group. Subjects were equally distributed according to gender. The experimental group reported having somewhat less previous angiogram experience, but more family angiogram experience, they received more PTCA information from a friend or relative, and they were discharged from the hospital 1.1 hours before the control group.

Reliability of the Knowledge Questionnaire using the Spearman Brown Split-Half Test did not meet the criterion level of  $r \geq .70$ . The Student's t-test of independent group means resulted in a t-value of -1.17 which was non-significant at the  $p \leq .05$  level. Thus the null hypothesis that there was no difference in knowledge test scores of patients who received the booklet and of patients who did not

receive the booklet, was not rejected. Computation of percentage of correct responses for the PTCA Questionnaire revealed that the experimental group scored 6.3% higher than the control group. Analysis of data from the evaluation questionnaire suggests that subjects found the booklet and pictures to be helpful to themselves and their family.

## CHAPTER 5

### DISCUSSION OF RESULTS

#### Introduction

This study was conducted to measure the effects of a structured education booklet on subjects' knowledge as based on adult learning theory. The null hypothesis, that there was no difference in knowledge test scores of patients who received the booklet and of patients who did not receive the booklet, was tested. A post-test only design was used to test the research questions posed in this study.

The question this study was designed to answer was: Will there be a difference in knowledge test scores between the experimental and control subjects? Knowledge is defined as the extent to which a patient recalls information received during instruction. A secondary or additional question was: What are the patients' opinions about the nature and completeness of the booklet?

Findings and limitations of the study are discussed in this chapter. Implications for nursing and recommendations for further study are also presented.

### Findings

The difference in the dependent variable of adult learning that occurred as a result of the independent variable, the education booklet "PTCA-- A Patients' Guide", was examined. Results of the t-test for independent means did not support any significant difference in knowledge as a result of the education booklet.

In this study, the Spearman-Brown Split-Half Test was used to determine the homogeneity, or internal consistency reliability, of the knowledge questionnaire. The first eight multiple choice questions were compared to the last eight true/false questions with a criterion level of  $r \geq .70$ . Content-validity was previously established by a panel of three experts and the questions were correctly paired before the study. The results suggest the knowledge instrument needs further development to attain internal consistency reliability before conclusions can be made about knowledge gained from the patient education booklet.

Pair-wise Pearson product-moment correlation coefficients were computed to determine if the paired questions were correlated. Of nine parallel pairs, two were deleted since question two was omitted and question sixteen had no variance. Of the remaining seven pairs, four pairs were correlated significantly at the  $p \leq .05$ ; three pairs were not correlated

( $p \geq .320$ ). Correlations between paired items but could be improved upon by adding the inadvertently deleted question, rewording question sixteen, and adding more questions to increase the sampling of the content domain (Kerlinger, 1986 and Burns & Groves, 1987).

Weak correlations in nursing research tend to be ignored when in fact relationships may have some meaning in nursing knowledge when examined with other variables, which is similar to a Type II error (Burns & Groves, 1987). Weak correlations may exist if the measurements are not powerful enough to detect fine discriminations, which may occur in a newly developed crude instrument. Also, the correlational studies may not have a wide range of variance for relationships to be detected. Increasing the sample and the number of questions on the questionnaire may increase the variance and decrease the chance of error.

Correct item responses for each question were calculated, from the knowledge questionnaire, in order to compare the item scores between the control group and the experimental group. This comparison revealed a 6.3% higher score in the experimental group than in the control group, which may be expected based on the theory that knowledge is gained by introducing education material. However, this theory was not supported by the test of differences of the mean scores on the knowledge questionnaire. A possible Type II error due to the

small sample size cannot be ignored. Although, the contradictory findings may be due to measurement error secondary to the use of a new and untested index of the dependent variable. Another variable captured in the demographic data revealed that 92.9% of the control group had a previous angiogram before they were admitted to the study. The angiogram procedure consists of inserting a catheter into the heart and injecting dye into the coronary arteries to identify plaques. The angioplasty procedure also includes the insertion of a catheter into the coronary artery, but for the purpose of fracturing a plaque. Due to the similarity of the procedures, learning from the angiogram cannot be ruled out and was not measured before angioplasty.

Comparison of the responses from the 16 questions showed that the experimental group scored higher on 9 questions, lower on 6 questions, and the same on 2 questions. In question five the subjects were asked to identify three risk factors for coronary artery disease, which were identified in the patient education booklet. The control group scored three correct responses and the experimental group scored zero. When compared with its true/false pair, question 13, each group scored about 55%. The element of chance when answering a true/false dichotomous question may be the reason for the discrepancy.

### Relationship of Findings to Conceptual Framework

This study was conducted to measure the effects of a written patient education booklet on subjects' knowledge as measured by the difference in scores of two groups. In response to the question of whether the educational booklet increased adult learning, the findings from the knowledge questionnaire indicated no statistical difference.

There are several factors which influence adult learning on a continuous basis, such as motivation and stress. This study analyzed the effect of learning and knowledge, but did not take into account the influence of other factors such as adaptation and anxiety. Data from this study do not support a positive relationship between patient education and knowledge. Since the knowledge questionnaire as a measurement tool requires further development, the relationship between education and knowledge with this patient population needs further investigation.

### Limitations

The major limitation in this study was the lack of reliability of the Knowledge Questionnaire. The questionnaire needs to be rewritten in multiple choice format and a minimum of 30 questions for correlation of items. The revised

questionnaire needs to be retested in a pilot study to establish reliability.

The patient population and study design may also have been a source of error. The patient education booklet was originally written for patients undergoing coronary angiogram and angioplasty simultaneously. Eighty-four percent of the total sample population underwent a previous angiogram, which is a procedure very similar to angioplasty. Thus the experimental and control groups may have been similar and no difference in knowledge measurable, which is an inherent weakness of post test only design.

This study contained a small sample size of 30 total subjects, 16 subjects that received the education booklet and 14 that did not. Nine months of data collection was necessary to obtain 30 subjects that had not received a previous angioplasty. This was a small sample from which to derive conclusive results from the control and experimental subjects.

### Implications

From this study some recommendations can be made for nurses working with PTCA patients. Identification of the patient knowledge base and education needs is essential in order to plan an individualized patient education plan. The nurse might assume that if a patient had a previous angiogram



that some learning has already occurred due to the experience of the procedure itself. Identification of an education plan, with knowledge objectives, would assist the nurse to facilitate learning during the short time available before angioplasty.

### Recommendations

From the results of this study, several recommendations for future research can be outlined according to instrument reliability and study design.

One important source of error was the reliability of the instrument. The questions need to be developed into thirty or more multiple choice questions in order to more adequately sample the domain of patient knowledge. True/false questions need to be converted to multiple choice questions in order to determine if the difference in correlations is related to content or the format of the questions. A larger number of items might also improve the correlations by increasing the discrimination and variance when comparing two halves of an instrument.

The education booklet was written for patients at another hospital where patients received angioplasty at the time of the first angiogram. When a patient population receives the angiogram and angioplasty separately, a pretest-posttest design

may be more appropriate in order to assess learning from the booklet. The measurement of other variables such as stress, anxiety, and uncertainty before and after angioplasty may give more insight into the learning process prior to angioplasty and the knowledge measured following angioplasty.

#### Summary

The results of this study were not consistent with that of other studies in the literature which reported an increase in knowledge from patient education material. Whether learning occurred and was not adequately measured by the newly developed knowledge questionnaire is unknown. The null hypothesis that there was no difference in knowledge test scores between experimental and control subjects was not rejected at the significance level of  $p \leq .05$ . Therefore revision of the instrument and refinement of the study design is suggested prior to using the PTCA booklet in the future.

**APPENDIX A**  
**HUMAN SUBJECTS APPROVAL**



# University Medical Center

1501 North Campbell Avenue  
Tucson, Arizona 85724

Nursing Department

72

January 5, 1988

Sharon L. Snyder, RN, BS  
4933 E. Alta Vista  
Tucson, Arizona 85712

Dear Sharon:

Your request for access for the proposed research, "Percutaneous Transluminal Coronary Angioplasty Education Booklet on Patient Knowledge" has been approved. The clinical units for which you are approved are 6 East, 7 West, and cardiovascular ICU. Please contact the nurse managers prior to initiating data collection.

Please notify me when you have completed data collection.

We look forward to having you report your results and providing us with an abstract of your findings. Please contact me if you have any questions or concerns at 626-5191 or 6205.

Sincerely,



Carolyn Murdaugh, RN, PhD  
Director of Nursing Research

cc: C. Haskins  
A. Whittaker  
A. A. Eyherabide  
J. Matte  
M. Moran



THE UNIVERSITY OF ARIZONA  
TUCSON, ARIZONA 85721

COLLEGE OF NURSING

73

MEMORANDUM

TO: Ms. Sharon L. Snyder

FROM: Linda R. Phillips, PhD, RN, FAAN, *LRP*  
Associate Dean for Research

DATE: December 9, 1988

RE: Human Subjects Review: "The Effect of a Percutaneous Transluminal Coronary Angioplasty Education Booklet on Patient Knowledge"

Your project has been reviewed and approved as exempt from University review by the College of Nursing Ethical Review Subcommittee of the Research Committee and the Director of Research. A consent form with subject signature is not required for projects exempt from full University review. Please use only a disclaimer format for subjects to read before giving their oral consent to the research. The Human Subjects Project Approval Form is filed in the office of the Director of Research if you need access to it.

We wish you a valuable and stimulating experience with your research.

LRP/ms

**APPENDIX B**  
**SUBJECT DISCLAIMER FORM**

### Disclaimer

Project title: The Effect of a Percutaneous Transluminal Coronary Angioplasty Education Booklet on Patient's Knowledge

The purpose of the study is to evaluate the effectiveness of a Percutaneous Transluminal Coronary Angioplasty (PTCA) teaching booklet. The investigator will compare the knowledge of patients that have received the teaching booklet with patients that have not. The subjects that receive the booklet will be named group one and will be asked to read the information booklet before the angioplasty procedure. The time required to read the booklet is approximately twenty minutes. Then they will be asked to complete two short questionnaires after the procedure but before discharge from the hospital. Completion of the questionnaires will take about twenty minutes total.

The other subjects, group number two, will not receive the booklet before angioplasty. This group will be asked to complete one short questionnaire which will require about ten minutes to finish, before discharge from the hospital.

You are being asked to voluntarily complete the questionnaires and by responding you will be giving your consent to participate in the study. The questionnaires contain questions about heart disease, the PTCA procedure and risk factors. The completion time for the questionnaires is approximately ten minutes each. The total amount of time required for participation in the study will be forty-five minutes for group number one and thirty minutes for group number two.

The information obtained from the questionnaires will be analyzed and used to complete a masters thesis at the College of Nursing, University of Arizona. Only the investigator and the thesis advisor will have access to the information. A coding system will be used to identify the questionnaire and you will remain anonymous. There are no known risks involved in completing these questionnaires.

You are entitled to ask questions and receive answers to those questions at any point in the study. Your participation is voluntary and you have the freedom to withdraw from the study at any time without ill will or risk to your patient status. Also, no monetary payment will be made for your participation. Thank-you for your participation.

Sharon L. Snyder R.N., B.S.N.  
Graduate Student  
College of Nursing  
University of Arizona

**APPENDIX C**  
**DATA COLLECTION SHEET**



## DATA COLLECTION SHEET

1. Investigator 1 or 2 (circle one)
2. Subject Code Number:
3. Group: 1=control  
2=experimental
4. Number of days since admission:\_\_\_\_\_days
5. Age:\_\_\_\_\_
6. Sex:\_\_\_\_\_
5. Cardiac Diagnosis:\_\_\_\_\_
6. Highest Level of Education completed:\_\_\_\_\_years
7. Did patient have previous angiogram? (circle one) yes no
8. Immediate family member have previous angiogram? yes no  
Immediate family member have previous PTCA? yes no
9. Did anyone else give the patient information about the PTCA? yes no  
If yes, who? Doctor, Nurse, Spouse, Relative,  
Friend, other\_\_\_\_\_
10. Booklet given to patient date\_\_\_\_\_ time\_\_\_\_\_  
PTCA procedure date\_\_\_\_\_ time\_\_\_\_\_  
Difference between time booklet given to patient and  
time of PTCA procedure \_\_\_\_\_  
hours/minutes.
11. Post-test given date\_\_\_\_\_ time\_\_\_\_\_  
12. Discharge date\_\_\_\_\_ time\_\_\_\_\_  
13. Field Notes:

**APPENDIX D**  
**PTCA KNOWLEDGE QUESTIONNAIRE**

Directions: The purpose of this questionnaire is to determine the knowledge a patient has after angioplasty.

Questions 1-8 are multiple choice. Circle the answer.

1. What is the cause of angina pain?
  - a. regurgitation of blood back into the heart
  - b. lack of oxygen to the heart muscle
  - c. eating too many rich foods
  - d. pressure which forces more blood into the heart.
  
2. What is the purpose of the balloon angioplasty procedure (PTCA)?
  - a. to flatten the plaque and increase the blood supply to the heart muscle
  - b. to coat the artery with a substance that prevents blockage
  - c. to bypass the blockage with a hollow tube
  - d. to scrape the plaque until it has all been removed
  
3. What is the purpose of blood thinning drugs used in the angioplasty procedure?
  - a. to keep the blood pressure low by keeping the blood thin
  - b. to make the catheter slippery, so it can be moved easier in the artery
  - c. to make the plaque squishy so it is easier to flatten with the balloon
  - d. to prevent clot from forming in the coronary artery at the PTCA site
  
4. What are three risk factors of heart disease?
  - a. smoking, high cholesterol, high blood pressure
  - b. strenuous exercise, fast heart rate, smoking
  - c. large amounts of high density lipids, male gender, obesity
  - d. high blood pressure, female gender, fast heart rate
  
5. It is important that I immediately report any chest pain to my doctor during this hospital stay because
  - a. it takes a long time for the medications to help relieve the pain
  - b. I might be suffering from a coronary spasm
  - c. it takes a while for the doctor to get to the hospital
  - d. he might want to take a chest x-ray

6. The purpose of leaving the catheter in my groin for 24 hours is
  - a. to draw blood for lab work
  - b. to prevent blood loss from the hole in my groin
  - c. to make sure I lie in bed and rest for 24 hours after the PTCA
  - d. for easy access to my heart in case I need a repeat PTCA
7. Narrowing of the coronary arteries occurs because
  - a. of a build up of cholesterol over a period of time
  - b. of old age
  - c. blood pumps through the vessels too slow
  - d. I eat too much salt
8. The leading health problem in the United States today is
  - a. cancer
  - b. obesity
  - c. coronary artery disease
  - d. osteoporosis

Question 9-17 are true or false. Circle T for true or F for false.

- |        |     |                                                                                                                   |
|--------|-----|-------------------------------------------------------------------------------------------------------------------|
| T or F | 9.  | The purpose of balloon angioplasty is to scrape off the plaque.                                                   |
| T or F | 10. | The purpose of blood thinning drugs is to keep the PTCA catheter slippery so it will move easily.                 |
| T or F | 11. | Angina pain is caused by decreased oxygen to the heart muscle.                                                    |
| T or F | 12. | Three risk factors of heart disease are: high blood pressure, high cholesterol and fast heart rate.               |
| T or F | 13. | The catheter in the groin is left in place for 24 hours to ensure that I stay in bed for that time.               |
| T or F | 14. | Heart disease is the leading health problem in the United States today.                                           |
| T or F | 15. | I should notify the doctor immediately if I have chest pain while in the hospital.                                |
| T or F | 16. | Narrowing of the coronary arteries is due to a complicated process of cholesterol build up.                       |
| T or F | 17. | I should make an appointment to see the doctor if I have chest pain unrelieved by Nitroglycerin when I'm at home. |

**APPENDIX E**  
**PTCA-BOOKLET EVALUATION**



## LIST OF REFERENCES

- American Heart Association (1973). Coronary Risk Handbook. New York: Merck and Co.
- American Hospital Association (1973). American Hospital Association: Statement on patient's bill of rights. Hospitals, 47(41), 16.
- Bartlett, E.E. (1984). Assessing benefits of patient education under prospective paying. Birmingham, Patient Education Newsletter, University of Alabama.
- Benbow Plewes, C.R. (1984). Helping nurses become better patient educators Canadian Nurse, 80, 41-42.
- Bigge, M.L. (1982). Learning theories for teachers. New York: Harper and Row Publishers.
- Billie, D.A. (1981). Practical approaches to patient teaching. Little, Brown and Company, Boston.
- Brink, P.J., Wood, M.J. (1983). Steps in planning nursing research, from question to proposal. Monterey: Wadsworth Health Sciences Division.
- Burns, N., Groves, S.K. (1987). The Practice of Nursing Research Conduct, Critique and Utilization. Philadelphia: W.B. Saunders Ca.
- Caffarella, R.S. (1984). The nurse's role in hospital based patient education programs for adults. Journal of Continuing Education in Nursing, 15(6), 222-3.
- Cohen, J.A. (1986). Sexual counseling of the patient following myocardial infarction. Critical Care Nurse, 6(6), 18-29.
- Foster, S.D. (1985). The challenge of patient education. MCN, 10, 343.
- Frank-Stromborg, M. (1985). Evaluating patient education material. Oncology Nursing Forum, 12(1), 65-7.
- Galan, K.M., Gruentzig, A.R., Holeman, J. (1985). Significance of early chest pain after coronary angioplasty. Heart Lung, 14(2), 109-112.

- Glazer-Waldman, H., Hall, K., Weiner, M.F. (1985). Patient education in a public hospital. Nursing Research, 34(3), 184-5.
- Gregor, F.M., (1984). Factors affecting the use of self-instructional material by patients with ischemic heart disease. Patient Education and Counseling, 6(4), 155-9.
- Griffiths, P. (1987). Creating a learning environment. Physiotherapy, 73(7), 328-331.
- Holden, J.E. (1985). Don't just tell your patients-teach them. RN, 7, 29-30.
- Holmes, D.R., Vlietstra, R.E., Mock, M.B. (1983). Employment and recreation patterns in patients treated by percutaneous transluminal coronary angioplasty: A multicenter study. Am J. Cardiol, 52, 710-713.
- Karam, J.A., Sundre, S.M., Smith, G.L. (1986). A cost/benefit analysis of patient education. Hospital and Health Administration, 4, 82-90.
- Keeley Robinson, Y. (1986). Teaching adults: Some issues in adult education for health education. Physiotherapy, 72(1), 49-52.
- Kerlinger, F.N. (1987). Foundations of Behavioral Research. New York: CBS College Publishing.
- Knowles, M. (1984). The adult learner: A neglected species. Houston: Gulf Publishing Company.
- Lanoue, A.S., Snyder, B.A., Galan, K.M. (1986). Percutaneous transluminal coronary angioplasty: Nonoperative treatment of coronary artery disease. J. Cardiovasc News, 1(1), 30-44.
- Lee, J.M. (1970). Emotional reactions to trauma. Nurs. Clin. N.Am., 5, 577-587.
- Levin, L. (1978). Patient education and self-care: How do they differ? Nursing Outlook, 3, 170-3.
- Loan, T., (1986). Nursing interaction with patients undergoing coronary angioplasty. Heart Lung, 15(4), 368-375.



- Lynn, M.R. (1986). Determination and quantification of content validity. Nursing Research, 35(6), 382-385.
- McHatton, M. (1985). A theory for timely teaching. American Journal of Nursing, 7, 798-800.
- McMahon, M., Miller, P., Wikoff, R., Garret, M.J., Ringel, K. (1986). Life situations, health beliefs, and medical regimen adherence of patients with myocardial infarction. Heart and Lung, 15(1):82-86.
- Meade, C.D., Byrd, J.C. (1987). Patient's reading proficiency of written smoking literature. Circulation Monograph No.9, October, vol 76, supp IV.
- Miller, A. (1985). When is the time ripe for teaching? American Journal of Nursing, 7, 801-4.
- Mills, G., Barnes, R., Rodell, D., Terry, L., (1985). An evaluation of an inpatient cardiac patient/ family education program. Heart Lung, 14(4), 400-6.
- Naisbitt, J. (1982). Megatrends. New York: Warner.
- Narrow, B. (1979). Patient teaching in nursing practice. New York: John Wiley & Sons.
- Ott, B.B. (1982). Percutaneous transluminal coronary angioplasty and nursing implications. Heart Lung, 11, 294.
- Parker, M.C., (1983). A nursing inservice curriculum for patient education. Nursing and Health Care, 4(3), 142-146.
- Partridge, S. (1982). The nurse's role in percutaneous transluminal coronary angioplasty. Heart Lung, 11, 505-511.
- Purcell, J.A., Griffin, P.A. (1981). Percutaneous transluminal coronary angioplasty. Am J Nurs, 81, 1620.
- Redman, B.K. (1978). Curriculum in patient education. American Journal of Nursing, 78, 1363-1366.
- Redman, B.K. (1984). The process of patient education (5th ed.). St. Louis: Mosby.

- Rice, V.H., Johnson, J.E. (1984). Preadmission self-instruction booklets, exercise performance, and teaching time. Nursing Research, 33(3), 147-151.
- Roberts, C. (1983). Reducing physician visits for colds through consumer education. Journal of the American Medical Association, 250(15): 1986-9.
- Rovers, R. (1987). Patient education: Changing our focus. Canadian Nurse, Oct, 12-15.
- Shillinger, F. (1983). Percutaneous transluminal coronary angioplasty. Heart Lung, 12, 45-47.
- Simmonds, S. (1979). National task force on training family physicians in patient education, a handbook for teachers. In Patient education, issues, principles and guidelines. J.B. Lippincott Company. Philadelphia.
- Sinclair, V.G. (1985). The computer as partner in health care instruction. Computers in Nursing, 3(5), 212-216.
- Stanton, M.P. (1985). Teaching patients: Some basic lessons for nurse educators. Nursing Management, 16(10), 59-62.
- Snyder, S.L. (1987). PTCA--A Patients Guide.
- Waltz, C.W., Bausell, R.B. (1981). Nursing research : Design, stats and computer analysis. Philadelphia: F.A. Davis.
- Wilson-Barnett, J., Osborne J. (1983). Studies evaluation patient teaching: implications for nursing practice. Journal of Advanced Nursing, 20, 33-44.
- Woody, A.F., Ferguson, S., Robertson, L.H., Nixon, M.L., Blocker, R., McDonald, M.R. (1984). Do patients learn what nurses say they teach? Nursing Management, 15(12), 26-9.