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**The identification and clinical validation of the defining  
characteristics of the nursing diagnosis Alteration in Tissue  
Perfusion: Cardiac**

**Kelly, David Jonathan, M.S.**

**The University of Arizona, 1989**

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THE IDENTIFICATION AND CLINICAL VALIDATION  
OF THE DEFINING CHARACTERISTICS OF THE NURSING DIAGNOSIS  
ALTERATION IN TISSUE PERFUSION: CARDIAC

by

David Jonathan Kelly

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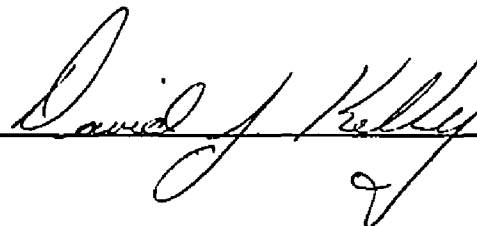
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## APPROVAL BY THESIS DIRECTOR

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## ABSTRACT

This exploratory study used Diagnostic Content Validity (DCV) and the Clinical Diagnostic Validation (CDV) models proposed by Fehring (1986) to clinically identify and validate the defining characteristics for Alteration in Tissue Perfusion: Cardiac. The literature based Kelly Cardiac Assessment Tool (KCAT) was designed as the data collection tool. The diagnostic content validity of the KCAT was 0.70. Twenty subjects, 18 years old and older were selected from a population who were admitted as inpatients in a southwestern university affiliated hospital. Data were collected through patient interviews, independent nurse assessment, and review of laboratory data. Using the steps described in Fehring's CDV model (1986) one major defining characteristic and 13 minor defining characteristics were clinically validated. The tool CDV score was 0.62. The nursing diagnosis Alteration in Tissue Perfusion: Cardiac was clinically validated and one major and 13 minor defining characteristics were identified.

## CHAPTER 1

### INTRODUCTION

The leading cause of death in the United States is myocardial infarction. This year an estimated 1,500,000 people will have a myocardial infarction and of those about 540,000 persons will die. There are more than 300,000 new cases of angina per year. Approximately 4,870,000 people today have a medical history of myocardial infarction, angina or both (American Heart Association, 1989). Nurses provide care to patients experiencing myocardial infarctions and myocardial ischemia in all stages of their disease. Nurses are involved with activities related to prevention of myocardial infarctions and ischemia, the care of patients during the acute phase, and cardiac rehabilitation.

Both myocardial infarction and myocardial ischemia result when oxygenated blood perfusion to the cardiac tissue is impaired. Angina is the subjective symptom of pain experienced by people who have ischemia of cardiac tissue. Quick and accurate diagnosis of impaired oxygenated blood perfusion of cardiac tissue is needed to avoid development of progressive increase of serious pathophysiological conditions that include: a) ventricular arrhythmias, b) conduction pattern disturbances, c) myocardial cell necrosis or myocardial infarction, d) decreased cardiac output, and e) death. Registered nurses remain at the bedside of the patient to administer physical

care, and emotional support. They continuously assess and monitor the patient's condition. The nurse is responsible for the first line assessment of any changes in the patient's condition and initiates immediate nursing interventions for the treatment of the patient's symptoms. In addition to the monitoring, assessing and intervening functions, the professional nurse's responsibilities include initiating, evaluating and revising the nursing plan of care. Registered nurses have a multi-faceted and substantial responsibility to patients experiencing an imbalance of cardiac oxygen supply and demand. These nursing responsibilities indicate a need for an approved physiologically based nursing diagnosis that accurately describes the response of the patient who is experiencing an imbalance between cardiac oxygen supply and demand.

Communication of the conclusions of the assessment process is an essential part of the nurses' role. Nursing diagnoses assist nurses in communicating the patient's response to behavioral and physiological health problems to other nurses as well as to other members of the health team. Nurses currently have no nursing diagnosis that reflects the pathophysiological phenomenon of the patient experiencing an imbalance of cardiac oxygen supply and demand. In a study designed to identify and validate nursing diagnoses frequently identified in the care of the cardiovascular patient, Kim et al (1980) identified the nursing diagnosis



(NDx) alterations in coronary circulation. Alteration in coronary circulation was identified again when the study was repeated with a larger sample (Kim et al, 1984). However, a search of the literature revealed no additional studies conducted to validate the nursing diagnosis, alteration in coronary circulation. Although the pathophysiological phenomenon of imbalance between cardiac oxygen supply and demand has been recognized, no current nursing diagnosis describes the patient's response to the phenomenon.

A nursing diagnosis does exist for the patient who experiences a decrease in cardiac output. However, the etiology and defining characteristics associated with the diagnosis, alteration in cardiac output: decreased, do not accurately describe the pathophysiological condition of the patient experiencing an imbalance of cardiac oxygen supply and demand and therefore, is not appropriate for identifying signs and symptoms, directing nursing interventions, or stating patient outcomes.

A new nursing diagnosis, Alteration in Tissue Perfusion: Cardiac, that accurately describes the condition of the patient experiencing the pathophysiological phenomenon of imbalance of cardiac oxygen supply and demand would permit nurses to identify signs and symptoms, implement appropriate nursing interventions, and evaluate care. Nurses would then be able to provide care based on empirical data. The effectiveness of nursing care would be

improved for the nearly two million people who experience an imbalance of cardiac oxygen supply and demand each year.

#### **Purpose**

The purpose of this study is to identify and validate the defining characteristics associated with the nursing diagnosis, Alteration in Tissue Perfusion: Cardiac.

#### **Conceptual Orientation**

The conceptual orientation for this study is based on the concepts of nursing diagnosis within the nursing process and the nine categories of the Nursing Diagnosis Taxonomy I that are associated with the patterns of unitary man, (Kritek, 1986). Alteration in Tissue Perfusion: Cardiac, is incorporated within the Nursing Diagnosis Taxonomy I.

#### **Nursing Diagnosis Within the Nursing Process**

Little & Carnevali (1976) state, "...the term 'nursing process' has been coined to label a concept involving a pattern of observation and logical thinking that is the basis for formulating the nursing care plan" (pp. 11). The nursing process steps have been identified as; a) assessment, b) plan, c) implementation, and e) evaluation. Kim (1983) states that, "Within the framework of the nursing process, a nursing diagnosis can be defined as the end of the assessment phase,..." (Kim, 1983, pp. 5). Guzzetta and Dossey (1983) suggested that the nursing process be extended to five steps in order to emphasize the process of nursing diagnosis. They identified the five steps as; a)

assessment, b) diagnosis, c) planning, d) implementation, and e) evaluation, (Guzzetta & Dossey, 1983, pp. 283).

Whether the nursing process is considered to be a four or five step process, NDx is an essential phase in which the nurse makes a clinical, concluding judgement about the patient's signs and symptoms that the patient presents. The judgement is in the form of a diagnostic statement that describes the pathophysiological status of the patient and provides direction for nursing interventions.

#### Nursing Diagnosis (NDx)

Although a review of the nursing literature revealed several definitions for nursing diagnosis, the North American Nursing Diagnosis Association (NANDA) recognizes four different definitions. For the purposes of this study, NDx is defined as:

"... a clinical judgement about an individual, family or community which is derived through a deliberate, systematic process of data collection and analysis. It provides the basis for prescriptions for definitive therapy for which the nurse is accountable. It is expressed concisely and it includes the etiology of the condition when known."

(Shoemaker, 1984, pp. 94).

To effectively describe the conclusion of the assessment phase of the nursing process, the nursing diagnosis should include the following components; a) problem statement, b) etiology statement, and c) a signs and symptoms or defining characteristics statement (Gordon, 1976, pp. 1298). The problem statement provides a label

that describes the patient's health problem. Qualifying adjectives are used along with the label to help describe the stage, phase, or level of the health problem (Gordon, 1976).

The second component of the nursing diagnostic statement describes the etiology of the condition when known. The etiology identifies the "...clinical and personal situations that can cause the problem or influence its development." (Carpenito, 1987, pp. 13).

The third component of the nursing diagnostic statement is the signs and symptoms or defining characteristic statement. Defining characteristics are "...a cluster of signs and symptoms that are observed in the person with the problem." (Carpenito 1987, pp. 13). The defining characteristics are divided into major and minor defining characteristics. The major defining characteristics are signs and symptoms that are present a majority of the time this phenomenon occurs (Carpenito, 1987). Therefore, one or more of these major defining characteristics must be present in the person with the actual health problem in order for the nursing diagnosis to be made. Minor defining characteristics are signs and symptoms that are frequently present in the person with the actual health problem but do not have to be present for the nursing diagnosis to be made. Therefore, the patient may demonstrate some or all of the minor defining characteristics when the nursing diagnosis is

made (Carpenito, 1987).

Validation of the defining characteristics is necessary to ensure that the signs and symptoms occur in the patient for whom the nursing diagnosis is being made. If these defining characteristics can be identified as occurring in a cluster in the empirical setting the nursing diagnosis is considered valid (Fehring, 1987).

#### Nursing Diagnosis Taxonomy I

Figure 1 depicts a model of the conceptual orientation on which this investigation is based. The Nursing Diagnosis Taxonomy I is the first official taxonomy of nursing diagnoses (NANDA, 1986, pp.1414). Although this taxonomy is not complete, it does provide the framework within which the concepts related to nursing diagnoses are placed.

The Nursing Diagnosis Taxonomy I has four levels of abstraction. Level I is the most abstract level and represents the patterns of unitary man, human response patterns, or human response pattern categories. Level II represents alterations in human responses, normless categories, or assessment categories. Level III represents the phenomenon of concern categories (not the phenomenon themselves). Level IV is the most concrete level and represents the phenomenon of concern (the actual nursing diagnostic label) (Kritek, 1986).

Figure 1 demonstrates the location of the proposed new nursing diagnosis in the nursing diagnosis taxonomic

structure. Level I is Exchanging and is defined as "a pattern of mutual giving and receiving.", (NANDA, 1986, pp. 1414). Level II is Alteration in Circulation. This level denotes the alteration is human responses. The brackets denote that it has yet to be formally accepted or validated by the North American Nursing Diagnosis Association (NANDA). Level III is alteration in cardiopulmonary tissue perfusion. This level denotes the phenomenon of concern category but not the phenomenon itself. Level IV is the diagnostic label of Alteration in Tissue Perfusion: Cardiac. This level denotes the phenomenon of concern (Kriteck, 1986).

The three components of the nursing diagnostic statement are the problem statement, the etiology statement, and the defining characteristics. The problem statement Alteration in Tissue Perfusion: Cardiac is defined as, an acute state in which an individual experiences at the cellular level, a decrease in the nutrition and oxygenation with a concomitant increase in carbon dioxide due to an imbalance of cardiac oxygen supply and demand. The etiology statement, an imbalance of cardiac oxygen supply and demand, describes the pathophysiological state that influences the development of alteration in tissue perfusion: cardiac. The major and minor defining characteristics were identified and clinically validated in this study.

**FIGURE 1.** Nursing Diagnosis Model for Alteration in Tissue Perfusion: Cardiac within the Exchanging Pattern of Nursing Diagnosis Taxonomy I.

Nursing Diagnosis Taxonomy I

1. Exchanging

1.4. [Alteration in Circulation]

1.4.1.1. Altered Cardiopulmonary  
Tissue Perfusion

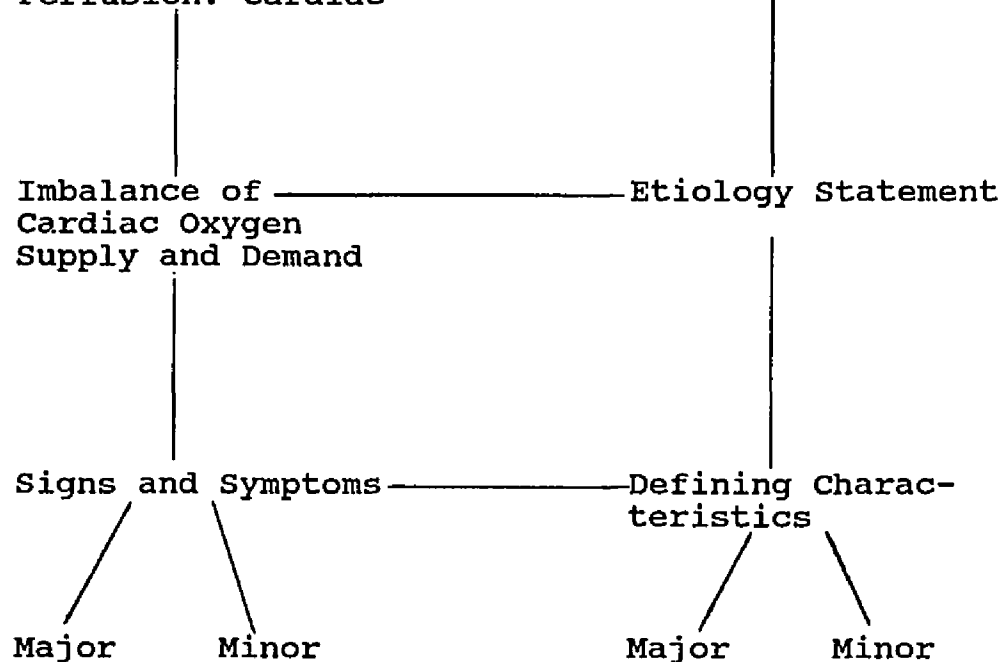
1.4.1.1.3 Alteration in Tissue Perfusion: Cardiac ————— Problem Statement

Imbalance of Cardiac Oxygen Supply and Demand ————— Etiology Statement

Signs and Symptoms ————— Defining Characteristics

Major                  Minor

Major                  Minor



### Problem Statement

Currently many people experience health problems as a result of an alteration in tissue perfusion: cardiac related to an imbalance of cardiac oxygen supply and demand (American Heart Association, 1989). Consequently, many nurses assess, plan, deliver, and evaluate care of patients with an imbalance between cardiac oxygen supply and demand. Nursing judgements are the outcome of the assessment process. If nursing judgements made at the conclusion of the completed nursing assessment can be organized within nomenclature that reflects the phenomenon of nursing concern (the nursing diagnosis problem statement), essential assessment information can be communicated efficiently and effectively to other nurses and health professionals caring for the patient.

The etiology segment of the nursing diagnosis statement provides direction for appropriate nursing interventions in the nursing plan of care. The defining characteristics provide the evidence of the signs and symptoms of the patient experience. The P-E-S (problem, etiology, signs and symptoms) format of formulating nursing diagnosis provides a method which permits nurses to effectively and efficiently document their findings. Therefore, nursing diagnoses provides a common language which nurses can use to assess patients and describe their findings. It is essential that nurses accurately and concisely communicate their findings



with each other and other health professionals to ensure that patients consistently receive high quality nursing care.

Because defining characteristics must be identified and clinically validated for any new or proposed nursing diagnosis to be accepted by NANDA for further testing, defining characteristics must be observable in the patient who is experiencing an imbalance of cardiac oxygen supply and demand. Therefore, the problem investigated by this study was the identification and clinical validation by nurses of the defining characteristics present in the patient who is experiencing Alteration in Tissue Perfusion: Cardiac related to an imbalance of cardiac oxygen supply and demand.

#### Research Questions

This study was designed to answer the following research questions.

1. What are the defining characteristics associated with the nursing diagnosis: Alteration in Tissue Perfusion: Cardiac?
2. Of the defining characteristics identified, which can be clinically validated as major defining characteristics?
3. Of the defining characteristics identified, which can be clinically validated as minor defining characteristics?

### Definitions

Myocardial infarction results when the blood supply to cardiac tissue becomes absent for a period of three to six hours (Reimer, Rasmussen, & Jennings, 1977; Misinski, 1987). When a complete cessation of oxygenated blood perfusion to cardiac tissue occurs, cell necrosis does not follow immediately, but is a dynamic event that occurs over several hours, (Misinski, 1987). For the purposes of this study, patients will be classified as having suffered from a myocardial infarction if they have a significant CK-MB fraction (3% or more) within 48 hours after onset of signs and symptoms.

Cardiac ischemia is defined as hypoxia without necrosis of the myocardial tissue as a result of an imbalance between oxygen demand and oxygen supply to the cells of the myocardial tissue. For the purposes of this study, signs and symptoms of cardiac ischemia are those items included on the Kelly Cardiac Assessment Tool (KCAT).

Major defining characteristics are: "... signs and symptoms that must be present in order to validate a particular diagnosis." (Carpenito 1987, pp. 14). For this study, any signs or symptoms with an individual weighted item score of 0.80 or more on the (KCAT) using Fehring's (1986) clinical diagnostic validity (CDV) model, were classified as a major defining characteristic.

Minor defining characteristics are: "...signs and

symptoms that appear to be present in many but not all individuals to whom the diagnosis could be applied." (Carpenito 1987, pp. 14). For this study any sign or symptom that attained an individual weighted item score on the KCAT using the CDV model of  $\leq 0.79$  but  $\geq 0.50$  were classified as minor defining characteristic.

**Alteration in Tissue Perfusion: Cardiac** is an acute state in which an individual experiences at the cellular level, a decrease in the nutrition and oxygenation with a concomitant increase in carbon dioxide due to an imbalance cardiac oxygen supply and demand. For the purpose of this study, **Alteration in Tissue Perfusion: Cardiac** was determined by the presence of subjective and objective signs and symptoms as identified in the KCAT.

#### **Significance To Nursing**

Abdella (1969) described the science of nursing as "... a body of cumulative scientific knowledge, drawn from the physical, biological, and behavioral sciences that is uniquely nursing" (pp. 4). Nursing diagnoses provide the nomenclature which reflects the unique body of scientific nursing knowledge. In order to address patient problems from a holistic perspective, nursing diagnoses need to reflect both behavioral and physiological nursing problems. The identification and validation of defining characteristics of the nursing diagnosis, **Alteration in Tissue Perfusion: Cardiac** would extend nursing science. A

new clinically validated cardiac nursing diagnosis would enable nurses to consistently identify and label the patient's response to pathophysiological condition of the imbalance of cardiac oxygen supply and demand would provide direction to planning, implementation, and evaluation of nursing care.

Kim (1984) defines physiological nursing diagnoses as "... an inferential statement made by a professional nurse that describe physiological disturbances that impede optimum functioning and then direct the nurse to specific interventions, both independent and interdependent" (pp. 60). Physiologic nursing diagnoses result in the planning and implementation of both interdependent and independent nursing interventions. Interdependent nursing interventions, also known as collaborative interventions are those interventions the nurse implements based on independent judgement and decision making which can be made in a collaborative manner with a physician's order to implement the medical regimen or to carry out medical orders (Kim, 1984). Independent interventions are those interventions a nurse can implement without a physician's order and which can solve the patient's problems without consultation or collaboration with physicians or other health professionals (Kim, 1986).

Alteration in Tissue Perfusion: Cardiac is classified as a physiological nursing diagnosis. The diagnosis

describes a physiological disturbance, alteration in cardiac perfusion that impedes the patient's optimum functioning. In addition, the diagnosis directs the nurse to specific independent and interdependent nursing interventions.

The nursing diagnosis, Alteration in Tissue Perfusion: Cardiac, can provide the basis for the prescription of definitive nursing therapies that include : a) assessment of specific patient parameters, b) organization of assessment information for determining priorities in further assessment and monitoring, c) direction for appropriate nursing interventions, d) formulation of an individualized nursing care plan, and e) evaluation/review of the nursing plan of care.

Nursing assessment and monitoring of the patient are independent nursing interventions. The nurse is responsible for accurately assessing the patient and using independent judgement in determining timely and appropriate nursing interventions.

Because the plan of nursing care is continually evaluated for effectiveness and revised as the patient's condition changes, the provision of the nursing diagnosis Alteration in Tissue Perfusion: Cardiac with identified, validated defining characteristics would provide nurses with empirical data on which to assess, intervene, evaluate and revise the nursing care plan.

Identification and validation of the defining

characteristics for Alteration in Tissue Perfusion: Cardiac will provide data for the nurse to use in assessing the patient experiencing an imbalance of cardiac oxygen supply and demand. The newly proposed nursing diagnosis will provide a research basis for accurate nursing assessment of the cardiac patient and enable nurses to communicate their findings to nurses and other health professionals. Nursing care will be improved and accurate documentation of the care will be facilitated.

#### Summary

In Chapter I the incidence and etiology of cardiac infarction and ischemia were reviewed. The role of of nurses caring for patients with alterations in cardiac tissue perfusion was described. The need for a nursing diagnosis, Alteration in Tissue Perfusion: Cardiac was examined. A conceptual orientation was proposed to identify and validate the defining characteristics associated with the new nursing diagnosis. The purpose of the study and associated research questions were stated. The significance of the study to nursing was explained.

## CHAPTER 2

### LITERATURE REVIEW

This chapter will present a review of the literature in relation to the development of the concept of nursing diagnosis, nursing diagnosis taxonomy, nursing diagnoses used with patients experiencing cardiac problems, and patients experiencing Alteration in Tissue Perfusion: Cardiac.

#### Nursing Diagnosis

McManus (1950) first coined the phrase nursing diagnosis almost 40 years ago. In 1953, Fry (1953) identified five areas of concentration for nursing diagnosis based on the patient needs of: a) treatment-medication, b) personal hygiene, c) environmental control, d) guidance-patient teaching, and e) human or self. Fry stated that the professional observation skills of reading, watching, and listening were needed to arrive at a nursing diagnosis (NDx), (Fry, 1953).

Abdellah (1957, pp. 4) published the following definition for nursing diagnosis "...a determination of the nature and extent of nursing problems by individual patients or families receiving care." Abdellah (1960) identified 21 nursing problems and generated one of the first nursing problem lists. Abdellah's typology of nursing problems included : a) maintenance of good hygiene, b) elimination needs, c) electrolyte balance needs, d) physiological

responses to the disease state, and e) understanding the role of social problems in the etiology of disease. The typology of 21 nursing problems focused on the patient, helped organize practice and established a scientific base from which research could be conducted (Dycus, Schmeiser, & Yancey, 1986). Abdellah's early work with nursing diagnosis and nursing problems occurred at a time during which the nursing profession was searching for its unique body of knowledge and had a profound effect on nursing education, research, and clinical practice (Dycus, Schmeiser, & Yancey, 1986).

Out of a perceived need for identification of the nurse's role in the clinical setting, two faculty members of St. Louis University, Gebbie and Lavin, initiated the First National Conference on Classification of Nursing Diagnosis in 1973, (Gordon 1982). One of the first major decisions made by the participants of this conference was that inductive work on diagnostic labels would proceed through empirical identification of patient problems. However, the decision to proceed with the inductive empirical work did not preclude theoretical work. Several nurse theorists at the conference formed a group that was invited and encouraged to begin organizing a conceptual framework. Thus, parallel work on identifying nursing diagnoses from the inductive and deductive perspectives began (Gebbie, 1982).



Participants at the first conference also appointed a National Task Force chaired by Dr. Marjorie Gordon to continue developmental work between conferences. The National Task Force accepted responsibilities in three areas; a) information exchange, b) education activities, c) research and development (Gordon 1982).

The nursing diagnosis conference group continued with biennial national conferences. Regional conferences were held more frequently. The formal name for the group was changed to the North American Nursing Diagnosis Association (NANDA) and bylaws were adopted in 1984. During the Seventh National Conference in 1986, the Nursing Diagnosis Taxonomy I was formally accepted (NANDA, 1986). In 1988, at the Eighth National Conference, additional diagnostic categories were accepted for testing. Currently 100 nursing diagnostic categories have been identified and are in the process of being tested, (Walker, 1988 Keynote Address).

Although NANDA has accepted four definitions for NDx, one of the most comprehensive definitions was formulated by Shoemaker (1984). Using the Delphi technique, Shoemaker composed the following consensus definition of a NDx:

"A nursing diagnosis is a clinical judgement about an individual, family, or community that is derived through a deliberate, systematic process of data collection and analysis. It provides the basis for prescriptions for definitive therapy for which the nurse is accountable. It is expressed concisely and includes the etiology of the condition when known."  
(Shoemaker, 1984, pp. 109)

"The term nursing diagnosis refers to an idea, a complex concept. As such it is a tool for thought." (Bircher, 1975, pp. 30). Nursing diagnosis has become an important tool for thought in nursing. Nursing diagnosis is both a concept and a process. As such, it has become an integral part of the nursing process, which is the basic methodologic approach to nursing care (Gordon, 1979).

Nursing diagnosis is a concluding statement of the assessment stage of the nursing process. Bircher (1975) stated that the process of nursing diagnosis synthesized the observed facts (O) of the client's condition and the related knowledge (K) of the nurse into a concise statement which represented the problem that the patient presented. Bircher demonstrated the process by the equation:

$$O + K = NDx$$

(Bircher, 1975, pp. 30, 32).

Warner, (1983) described seven benefits of the nursing diagnosis concept. She stated that nursing diagnoses could be used for, a) standardized communication among nurses, b) facilitation of writing patient outcomes to enhance quality assurance programs, c) patient classification systems for third party reimbursement, d) development of a nursing data base, e) nursing accountability, f) a unified definition of nursing practice, and g) theory development.

However, two immediate benefits of nursing diagnoses are standardization of unique nursing language and implications

for nursing interventions. The problem, etiology, signs and symptoms (PES) format provides a standardized way for nurses to express the patient health problem, contributing factors, and signs and symptoms. The problem statement is a label that describes the state of the patient's health. Terms such as ineffective, impaired, deficit and alterations are used to qualify changes in a patient's health status (Carpenito, 1987). The etiology statement or contributing factors are "...clinical and personal situations that can cause the problem or influence it's development." (Carpenito, 1987, pp. 12). The signs and symptoms or defining characteristic statements are "a cluster of signs and symptoms that are observed in the person with the problem" (Carpenito, 1987, pp. 13). The etiology and defining characteristic statements provide verification of the problem statement. In addition, the etiology and defining characteristics statements provide direction for the logical nursing interventions for the identified Ndx.. The PES statement provides the foundation for nursing clinical judgments about interventions and care.

Nursing diagnosis categories were initially arranged in an alphabetical list. In order to progress from the stage of factor isolating or naming theory to the stage of classification, the Ndx categories needed to be placed within an organizing framework. A major purpose of a nursing diagnosis taxonomy is to provide an organization

system for the nursing diagnoses nurses are identifying and validating.

Gebbie and Lavin (1974) proposed four steps for developing a system for the classification of nursing diagnoses; "1) identify all those things which nurses locate or diagnose in patients, 2) establish agreement on nomenclature for step 1, 3) group identified diagnoses into classes and subclasses, and 4) provide numerical or equivalent abbreviation substitutions for coding data relating to nursing diagnoses" (1974, pp 250-251). The first classification system was proposed by the theorist group in 1978 (Kritek, 1986).

#### Nursing Taxonomy

It was clear from the opening of the First National Conference that a formal classification typology was needed. Work on a Nursing Taxonomy began the year following the First National Conference. Although nurse theorists were involved in the first two Nursing Diagnosis Conferences it was not until Roy proposed that the theorists form a Task Force in preparation for the Third National Conference that they met as one group (Roy 1980). The focus of the work of the nurse theorist group was to construct a conceptual framework for nursing diagnoses. The theorist group developed a framework based on the nine patterns of unitary man. As an outgrowth of the development of the concept of Unitary Man, the theorist task force developed a taxonomic

classification of nursing diagnosis.

The first report of the work done on the taxonomy by the taxonomic committee was delivered to the Fifth National Conference by Dr. Phyllis Kritek (1984). The taxonomy classification schema was developed to coincide with the nine patterns of unitary man identified by the theorist group. The nine taxonomic trees were developed as Nursing Taxonomy I: a) exchanging, b) communicating, c) relating, d) valuing, e) choosing, f) moving, g) perceiving, h) knowing, and i) feeling. The taxonomic trees and their respective levels of development were represented diagrammatically and in legal outline form (Kritek, 1984).

Nursing Diagnosis Taxonomy I was endorsed by the Seventh National Conference in April 1986 (NANDA, 1986). Although the taxonomy is not complete at all levels, the framework is present. Logical deductive and inductive research is needed to complete the taxonomy. Currently there are four levels in the taxonomy with Level I being the most abstract concept and Level IV being the operational label of the phenomenon. The four Levels are formally: a) Level I: Patterns of unitary man, human response patterns, or human response patterns, b) Level II: Alterations in human responses, normless category labels, categories of assessment, c) Level III: Categories of phenomenon of concern (not the phenomenon themselves), d) Level IV Phenomenon of concern, (Kritek, 1986).

An example of the different levels was provided using the NDx of Alteration in Tissue Perfusion: Cardiac. Level I was the human response of, exchanging. Level II was the alteration in human response of, alteration in circulation. Level III was the category of concern, alteration in cardiopulmonary tissue perfusion. Level IV was the phenomenon of concern, Alteration in Tissue Perfusion: Cardiac.

### Nursing Diagnoses Used with Patients

#### Experiencing Cardiac Problems

Rossi and Haines (1979) identified from their clinical experience several nursing diagnoses related to patients experiencing myocardial infarctions. The nursing diagnoses identified were, a) alteration in comfort level (pain), b) alteration in cardiac output/activity intolerance, c) altered sleep patterns, d) lack of knowledge, e) noncompliance, f) alteration in self concept/body image, and g) maladaptive coping patterns, (Rossi & Haines, 1979, pp. 12). Their article was one of the first discussions of the use of NDx in the care of the patient experiencing cardiac alterations.

Kim (1980) used 18 staff nurses and four clinical nurse specialists (CNS) to identify NDx in adult hospitalized patients with cardiovascular diseases, selected from critical care and medical/surgical floors. None of the staff nurses was experienced with the use of nursing

diagnoses. The clinical nurse specialists were paired with the staff nurses to form an assessment team. The clinical nurse specialists assisted in the orientation of the staff nurses to train them in identifying Ndx.

Collectively, the assessment teams independently assessed 38 randomly selected adult patients. Each assessment team used an assessment guide that consisted of a list of: a) approved list of Ndx, and b) several data sheets for recording the Ndx, c) etiology, and d) defining characteristics. Staff nurses randomly selected patients with cardiovascular disorders and conducted the Ndx assessment. The CNS then performed an independent re-assessment of the same patient within six hours of the original assessment, (Kim, et al 1980).

Although total of 36 nursing diagnoses were identified, a list of the 12 most frequently used Ndx and their respective etiologies and defining characteristics was compiled. Decreased cardiac output and alteration in cardiac circulation were the most frequently identified Ndx. The third most frequently identified Ndx was alteration in electrolytes, (Kim et al, 1980).

In 1984 this same group of researchers (Kim et al, 1984b) replicated their 1980 study with a sample of 158 cardiovascular patients. They reported frequency of nursing diagnoses identified and their defining characteristics. The etiologies were identified and reported separately, and

not linked to the NDx with which they were identified.

The most frequently reported NDx was alteration in coronary circulation. The most frequent defining characteristic associated with alteration in coronary circulation was ischemic pain. Ischemic pain was defined as, a) pain, b) angina, c) neck pain, and d) hand-arm pain. Although alteration in coronary circulation was the most frequently reported NDx in both of these nursing research studies in which cardiac patients were studied, the NDx has not appeared on the approved NANDA list nor is it included in the recently accepted Nursing Diagnosis Taxonomy I.

The second most frequently identified NDx was alteration in cardiac output (Kim, 1984b). The most frequent defining characteristics used with alteration in cardiac output were indicators of inadequate gas exchange such as labored breathing, Kussmaul's respirations, and pulmonary congestion. The second and third most frequently reported defining characteristics associated with alteration in cardiac output were: a) electrocardiograph (ECG)/ enzyme changes, and b) abnormal neurologic responses. Although the problem statement of alteration in cardiac output: decreased usually suggests an alteration in the hemodynamic status of the patient, the defining characteristic of hemodynamic changes, was ranked fourth in frequency and fluid shift was ranked fifth in frequency. Etiologies were not attached to individual nursing diagnoses (Kim et al, 1984b).



The most frequently used etiologies for nursing diagnoses formulated for patients with cardiac problems included: a) coronary artery disease, b) atherosclerotic heart disease, c) ischemic heart disease, and d) heart disease (Kim et al, 1984b).

Dougherty (1985) conducted a study that validated the etiology, defining characteristics and nursing interventions for the NDX of alteration in cardiac output: decreased. She reviewed medical records, performed patient assessments, and questioned nurses and physicians caring for 33 patients with either the medical diagnosis of congestive heart failure (CHF) or cardiogenic shock (CS). The settings for the study were a coronary care unit, a surgical intensive care unit, and a coronary step down unit (Dougherty, 1985).

The CHF group consisted of 20 patients and the CS group consisted of 13 patients. Dougherty developed a tool to assess the etiology and defining characteristics of alteration in cardiac output: decreased. In addition, she collected data regarding nursing interventions from nurses notes or from questioning the nurses taking care of the patient. The nursing interventions were then classified as independent, interdependent or collaborative nursing, and dependent nursing interventions. The nursing interventions were reported to be the same for the CHF and CS groups.

The most frequently identified etiologies for each group (CHF and CS) were myocardial infarction (MI) and

arrhythmias. Dougherty divided the defining characteristics into subjective and objective characteristics for each medical group. The most frequently identified subjective defining characteristics for both groups were shortness of breath and chest pain. The most frequently identified objective defining characteristics for the CHF group were, a) pulmonary artery systolic pressure of  $> 30\text{mmHg}$  and b) pulmonary artery wedge pressure of  $> 20\text{mmHg}$ . For the CS group the most frequently identified objective defining characteristics were, a) abnormal heart rhythm, b) pulmonary wedge pressure of  $> 20\text{mmHg}$ , c) rales right lung, d) skin color changes, and e) diminished femoral pulses (Dougherty, 1985).

Dougherty's study provided clinical validation of the etiologies and defining characteristics for the Ndx, alteration in cardiac output: decreased. The most frequently identified objective defining characteristics for alteration in cardiac output: decreased were those involving: a) hemodynamic changes, b) abnormal heart rates, c) shortness of breath, and d) chest pain. Dougherty (1985) outlined nursing interventions associated with the Ndx and developed a cardiac output assessment tool for use in the clinical setting.

#### **Alteration in Tissue Perfusion: Cardiac**

Although an extensive review of the literature was conducted, no publication labeling the diagnosis of,

Alteration in Tissue Perfusion: Cardiac was found. However, the author has seen Alteration in Tissue Perfusion: Cardiac used in the clinical setting. The American Association of Critical Care Nurses has been conducting a survey of the most used nursing diagnoses in critical care. Alteration in Tissue Perfusion: Cardiac will appear in the published findings of the survey, (Murdaugh, personal communications, 1988).

#### Validation

Gordon & Sweeney (1979) introduced and defined three validation models for nursing diagnosis. The three models are: a) the retrospective identification model, b) the clinical model, and c) the nurse validation model (Gordon & Sweeney, 1979).

The retrospective model is based on the descriptions of health problems nurses have treated in the past. Using this model, nurses are instructed to describe nursing care of a health problems they have encountered. Selection of the sample of nurses require decisions about the nurses' expertise, the number years spent in that area of expertise, and the geographic representation desired. Once the sample is selected the participants are given guidelines to construct the diagnostic labels and to identify specific diagnoses and interventions within a broad framework (Gordon & Sweeney, 1979). The advantage of the retrospective model is the ability to generate a consensus from a large,

geographic representative sample of nurses that may be used for a national standardization of a specific nursing diagnosis. The retrospective model may be less than desirable for exploratory identification studies of specific nursing diagnoses (Gordon & Sweeney, 1979).

The clinical model is based on studies conducted in the clinical setting that were direct observations of patients by nurse raters. The data collection procedure for these clinical studies may use verbal data from the nurses and written data from the patient records. The clinical model requires assessment, diagnostic guidelines, and protocols for admitting and discharging patients from the study (Gordon & Sweeney, 1979). The disadvantages of this model include, a) time required for training and interrater reliability procedures, and b) consideration of unit or hospital established procedure for patient assessment and non-patient contact time for the nurses participating in the study. In addition, "unless multi-center studies are done simultaneously, geographic representation and stratification are lost." (Gordon & Sweeney, 1979, pp. 8). The advantages to the clinical model include: a) the procedure is conducive to exploratory, identification studies, b) the model design can accommodate large samples of a population, and c) use of the clinical setting, increases the content validity of the study (Gordon & Sweeney, 1979).

In the nurse validation model, nurses determine whether predetermined defining characteristics occur as a cluster in a significant number of cases to justify a nursing diagnosis (Gordon & Sweeney, 1979). There are two designs using the nurse validation model. Kim et al (1980; 1984) developed one design in which two nurses independently assess the same patients and from a predetermined list of nursing diagnoses independently determine which of the nursing diagnoses are appropriate for the individual patients. The second design uses a panel of experts with expertise in the area of the phenomenon of concern and in nursing diagnosis to review data collected by the investigator to determine the validity of the data collected (Gordon & Sweeney, 1979). The nurse validation model has the same loss of geographic representation and stratification as the clinical validation model. The nurse validation model, also has the same advantages as the clinical nurse validation model. The nurse validation model has the additional advantage of simplified data collection procedures regardless of which of the two designs are used. In using the second design, one investigator can gather the clinical data (Gordon & Sweeney, 1979).

The three models have been used in nursing diagnosis investigations. Each possesses a particular set of advantages and disadvantages. Collectively they provide guidelines for validation studies for a variety of purposes

in a variety of settings.

Fehring (1987) introduced the diagnostic content validation (DCV) model and the clinical diagnostic validity (CDV) model, which provided standardization procedures and statistical methods for the validation of a nursing diagnosis. The DCV model utilizes: "expert opinions from nurses on the degree to which each defining characteristic is indicative of a given diagnosis." (Fehring, 1987, pp. 626). A weighted response tool is utilized. The difficulty with the DCV model is finding the number of qualified nurse experts. Although the DCV model may not work well to establish a new nursing diagnosis, it is excellent for generalizing the validation of a new nursing diagnosis (Fehring, 1987).

The CDV model uses evidence of the occurrence of defining characteristics gathered from the clinical area to validate a nursing diagnosis (Fehring, 1987). As few as two nurse observers may be used to gather data by using a weighted observation tool with a predetermined number of patients. The CDV model incorporates a process to estimate an interrater reliability (Fehring, 1987). These two models described by Fehring (1987) provide standardized methods to establish a new nursing diagnosis from the clinical setting and to generalize those findings to the other geographic locations in the country.

### Summary

The evolution and development of the concept of NDx and the development of Nursing Diagnosis Taxonomy I were reviewed. Literature related to nursing diagnoses used with cardiovascular patients and related validation studies were reviewed. Research models used to validate of nursing diagnoses were reviewed (Gordon & Sweeney 1979; Fehring, 1987).

## CHAPTER 3

### METHODOLOGY

The study design, sample, site, data collection instrument, methods, and protection of Human Subjects were discussed in this chapter.

#### Design

An exploratory, descriptive, research design using Fehering's (1986) Clinical Diagnostic Validity (CDV) model to identify and clinically validate major and minor defining characteristics for the nursing diagnosis, Alteration in Tissue Perfusion: Cardiac. Fehring's CDV model was selected because it has been successfully used in previous studies and the Fehring model quantifies data from the presence or absence of defining characteristics.

#### Sample

The sample included 20 adult patients experiencing cardiac problems in a southwestern university medical center. The subjects for this study met the following criteria:

1. Were 18 years of age or older.
2. Had a medical diagnosis of unstable angina, rule out myocardial infarction, or myocardial infarction.
3. Did not exhibit signs and symptoms of cardiac failure or alteration in cardiac output: decreased.



4. Remained in the hospital for at least 48 hours or until three blood samples of CPK-MB cardiac enzymes were drawn.

#### **Protection of Subject's Rights**

The approval of this study by the Human Subjects Committee at the clinical site and by the Ethical Review Subcommittee at the College of Nursing ensured the protection of subject's rights while participating in this study. Confidentiality of data and anonymity of respondents were assured by using code numbers.

#### **Site**

The research of this study was conducted at a southwestern teaching medical center. This medical center has approximately 300 inpatient beds. Patients located in the cardiovascular intensive care unit and the cardiac step down unit were asked to participate in this study.

#### **Content Validity**

The Kelly Cardiac Assessment Tool (KCAT) used for this study is a new measurement tool. To establish content validity for KCAT the diagnostic content validity (DCV) method described by Fehring (1986) was used. The DCV method enables quantification of the content validity index first described by Waltz and Bausell (1981). The DCV methodology has successfully been used in research validating nursing diagnoses the past (Norris & Kunes-Connel, 1985; Fadden, Fehring & Kenkel-Rossi, 1987) and thus, has precedence for

use with this study.

The features of the DCV model used for this study include the following:

1. A panel of seven nursing experts rated the defining characteristics of the new nursing diagnosis, Alteration in Tissue Perfusion: Cardiac on a scale from 1 to 5. The 1 to 5 rating was interpreted as follows: 1=not at all characteristic; 2=very little characteristic; 3=somewhat characteristic; 4=quite characteristic; and 5=very characteristic.
2. Weights were assigned to each of the ratings as follows: 5=1.00; 4=0.75; 3=0.50; 2=0.25; and 1=0. The weighted ratio for each characteristic was found by summing the weights assigned to each response and dividing by the total number of responses. Weighted ratios were calculated for each characteristic.
3. Defining characteristics with a weighted ratio of less than 0.50 were discarded.
4. The overall DCV total was obtained by summing the individual weighted characteristic ratings and averaging the results.

In addition to the rating procedure of the DCV model described above, each member of the expert panel rated each item for clarity by using a dichotomous scale of "yes" or

"no". Any item rated as not clear by any of the raters was revised and re-submitted to the entire expert panel. Any revised item again rated as unclear by any of the expert panel was dropped from the KCAT.

The panel that reviewed the KCAT consisted of seven experts in cardiovascular nursing. The panel members included 4 master's prepared nurses with clinical backgrounds in cardiovascular nursing, one doctoral student in nursing with a cardiovascular background, and two doctorally prepared nurses with cardiovascular nursing backgrounds.

#### Interrater Reliability

The assessment of patients using the KCAT resulted in the generation of nominal and interval data. The nominal data was generated by rating the presence or absence of the described defining characteristic. The interval data was generated from 5 item Likert type scale that corresponds with the investigators' judgement about the importance of the defining characteristic to the diagnosis.

The two raters independently assessed at least three patients and independently completed the KCAT. The scores of each item on the KCAT were then compared. For the nominal data generated by the dichotomous scale the number of agreements was divided by the number of agreements possible ( $\#$  of agreement/  $\#$  of possible agreements). Interrater reliability was established if the raters were in

agreement 90% or more of the time.

To establish interrater reliability for the interval data generated by the degree of importance on the 5 point Likert scale the number of agreements were divided by the number of possible agreements. Again, interrater reliability was established if the raters were in agreement 90% or more of the time.

To establish interrater reliability prior to the data collection, three patients who met the inclusion criteria were assessed. If the 90% interrater agreement was not obtained with the assessment of the first three patients, assessment of patients was continued until the interrater reliability of 90% agreement was attained.

If the 90% level of interrater agreement was obtained, data collection continued. If the 90% level was not obtained, the raters reviewed the KCAT together and followed the previously described procedure to establish 90% agreement before data collection continued.

#### Data Collection Methods

Subjects who met the criteria for inclusion into the study were invited to enter the study. Written permission was obtained from twenty subjects willing to participate in the study. Demographic data consisting of age, sex, marital status, and primary medical diagnosis was collected.

A data collection tool, the Kelly Cardiac Assessment Tool (KCAT), was designed to identify 43 subjective and

objective defining characteristics present in patients with Alteration in Tissue Perfusion: Cardiac (appendix D). The defining characteristics used in the KCAT were identified in the literature and from the author's clinical experience. The author and a master's prepared nurse with a cardiovascular background served as raters for the study. The author screened patients for the study by first questioning the nurse in charge of the unit to determine the presence of patients who met the selection criteria. The nurse providing care for the patient was then questioned to determine if the patient had any signs or symptoms of cardiac failure. Cardiac failure was determined to be present if more than one of the following signs and symptoms were present: a) rhonchi in the lungs, b) pedal edema, or c) an S<sub>3</sub> heart sound. Cardiac failure was also presumed to be present if the patient had a temporary or permanent pacemaker or was in an unresolved atrial fibrillation or atrial flutter.

For all the patients who met the selection criteria, the main investigator: a) recruited patients for the study, b) obtained the patients' signatures on the informed consent forms, c) obtained the demographic data, and d) initiated the initial interview. The main investigator completed the KCAT and informed the second nurse rater of the patient's name, patient number and room number. The second nurse rater completed the KCAT as soon as her work schedule

allowed. No more than three days elapsed between assessments.

The two raters assessed each subject and their medical records to determine the presence or absence of each defining characteristic. Each rater interviewed the patient to complete the subjective portion of the KCAT and examined the medical records to complete the objective section of the KCAT.

Once the presence or absence of each defining characteristic was determined, each rater indicated the degree of importance of that defining characteristic in formulating the nursing diagnosis, Alteration in Tissue Perfusion: Cardiac. The degree of importance was measured on a five option Likert type scale as follows: 1=not at all important; 2=not very important; 3=somewhat important; 4=quite important; and 5=very important. Periodically, the second nurse rater returned completed KCATs to the primary investigator.

#### Data Analysis Plan

To provide quantifiable data from the nominal data gathered by the KCAT, Fehring's (1986) clinical diagnostic validity (CDV) model was used. Use of the CDV model provides a mean individual CDV score and a total instrument score. The CDV methodology has been used with previous nursing diagnosis validation studies (Norris & Kunes-Connel, 1985; Fadden, Fehring & Kenkel-Rossi, 1987).

The first score, the mean individual CDV score, is the weighted item CDV score which is used to determine whether the sign or symptom is a minor or major defining characteristic. The mean individual CDV score is determined by computing the following formula:

$$R = [A/A+D] \times [(F_1/N + F_2/N)/2]$$

Where

- A = Number of agreements
- D = Number of disagreements
- F<sub>1</sub> = Frequency of characteristics observed by the first observer
- F<sub>2</sub> = Frequency of characteristics observed by the second observer
- N = Number of subjects observed
- R = Mean individual CDV score

Defining characteristics with mean individual CDV scores of less than 0.25 were discarded. Defining characteristics with mean individual CDV scores of more than 0.80 were considered major defining characteristics. Defining characteristics with mean individual CDV scores of less than 0.80 but more than 0.50 were considered minor defining characteristics. All defining characteristics with mean individual CDV scores of  $\geq 0.50$  were considered to be clinically validated. Defining characteristics were ranked from the highest individual CDV score to the lowest individual CDV score.

The second score obtained was the total CDV score. The total CVD score was determined by summing and averaging the validated mean individual CDV scores. The total CDV score represents the CDV score for the total instrument.

The steps of the CDV model included in this study are

summarized as follows (Fehring, 1986):

1. Two "expert" clinicians observed and assessed an adequate number of patients who met the criteria for inclusion into the study.
2. The clinicians determined the presence or absence of the defining characteristics listed on the KCAT with those characteristics manifested by each patient observed.
3. Mean individual CDV score for each identified characteristic were calculated.
4. Characteristics with mean individual CDV scores less than 0.25 were discarded.
5. Characteristics with a mean individual CDV score of  $\geq 0.80$  were considered major defining characteristics.
6. Characteristics with a mean individual CDV score of  $\leq 0.79$  but  $\geq 0.50$  were considered minor defining characteristics.
7. The total CDV score was obtained by summing and averaging the weighted individual item scores for each of the validated defining characteristics.

Because of the exploratory nature of this study and to prevent premature exclusion of potential minor defining characteristics, those defining characteristics with mean individual CDV scores between  $\geq 0.25$  and  $\leq 0.49$  were



retained for further testing. However, these retained defining characteristics were not considered clinically validated.

The Likert scale used to determine the importance of the defining characteristic to the diagnosis on the KCAT yielded interval data. Means and standard deviations were calculated for each item of the Likert scale. The means of the ratings of each rater were averaged to obtain a mean of means of the degree of importance. The mean of the means of the ratings of the degree of importance were compared to the mean individual CDV scores of the clinically validated defining characteristics.

#### Summary

In summary, 20 patients were assessed by two expert clinicians using the KCAT. Demographic data were used to describe the population characteristics of the sample. The content validity using DCV scores was determined for each item. Interrater reliability estimates of the KCAT were determined. Fehring's (1986) model was used to determine the CDV score for each item and the instrument as a whole. Descriptive statistics were used to describe the sample and to determine mean ratings of importance of each item. Comparisons were made of the means of means of the degree of importance and the mean individual CDV scores of the clinically validated defining characteristics.

## CHAPTER 4

### RESULTS OF DATA ANALYSIS

The purpose of this study was to clinically identify and validate defining characteristics for a new cardiac nursing diagnosis called Alteration in Tissue Perfusion: Cardiac. This chapter presents a description of the population sampled, content validity of the assessment tool utilized and clinical validation of a cluster of defining characteristics.

The Kelly Cardiac Assessment Tool (KCAT) was developed to quantify subjective and objective defining characteristics frequently seen in patients experiencing an imbalance of cardiac oxygen supply and demand. Each defining characteristic was rated to determine its degree of importance to the nursing diagnosis. The KCAT was developed from critical care nursing literature as well as the clinical experience of the primary investigator.

#### Demographic Characteristics of the Sample

The sample consisted of twenty patients selected from a population admitted to a southwestern university affiliated hospital with the medical diagnoses of a) angina, b) unstable angina, c) rule out myocardial infarction or d) myocardial infarction. Description of the sample by sex, admitting medical diagnosis, marital status, and age are presented in Table 1.

Table 1

Characteristics of Subjects by Age, Sex, Medical Diagnosis,  
and Marital Status (N=20)

<u>Category</u>	<u>Frequency</u>	<u>Percentage</u>
<b>Sex</b>		
Male	7	35%
Female	13	<u>65%</u>
		100%
<b>Medical Diagnosis</b>		
Angina	1	5%
Unstable Angina	3	15%
Rule Out Myocardial Infarction	10	50%
Myocardial Infarction	6	<u>30%</u>
		100%
<b>Marital Status</b>		
Married	7	35%
Separated	2	10%
Divorced	4	20%
Widowed	7	<u>35%</u>
		100%

table continues

<u>Category</u>	<u>Frequency</u>	<u>Percentage</u>
Age (in years)		
44-45	2	10%
46-50	2	10%
51-55	1	5%
55-60	3	15%
61-65	0	0%
66-70	3	20%
71-75	2	15%
76-80	2	10%
81-85	0	0%
86-90	2	10%
91-95	0	0%
96-100	1	<u>5%</u>
		100%

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Ten subjects (50%) were admitted with the medical diagnosis of rule out myocardial infarction and 6 (30%) of patients were admitted with the medical diagnosis of myocardial infarction. Four subjects (20%) were admitted with the medical diagnosis of angina or unstable angina. An equal number of subjects (n=7, 35%) of the subjects were either married or widowed. Four subjects (20%) were divorced and two (10%) were separated.

In contrast to the national norms for cardiac patients, (Underwood, 1982; American Heart Association, 1989) the majority of this sample was female (n=13, 65%). The mean age of the sample was 66 years (S.D.=14.8) with a mode of 57 years. The ages ranged from 44 to 96 years. Eight subjects (40%) were below the age of 60.

#### Research Questions

The research questions will be reviewed to guide the presentation of the results of data analysis. The first research question addressed the defining characteristics that are associated with the nursing diagnosis, Alteration in Tissue Perfusion: Cardiac. The second and third research questions referred to the identified defining characteristics that could be clinically validated as major and minor defining characteristics.

#### Content Validity

The KCAT was distributed to seven experts in cardiac critical care nursing. Content validity of the KCAT was

established as described in Chapter 3. All items were judged to be clearly stated. The panel of experts rated the diagnostic content validity of both subjective and objective defining characteristics on a five point Likert type scale ranging from a rating of 1, not at all characteristic to a rating of 5, very characteristic. The scale rating was converted for analysis as follows: a) 1=0.00, b) 2=0.25, c) 3=0.50, d) 4=0.75, and e) 5=1.00.

All of the defining characteristics received a minimum Diagnostic Content Validity (DCV) score of  $\geq 0.50$  and were retained for testing. Following expert recommendation, the objective defining characteristic of hypertension was divided into separate systolic and diastolic items to make a total of 43 defining characteristics in the KCAT.

The mean diagnostic content validity (DCV) ratings for the subjective defining characteristic are presented in Table 2. The mean DCV score for the subjective defining characteristics in the KCAT was 0.70. The mean DCV ratings for the objective defining characteristics are presented in Table 3. The mean DCV score for the objective defining characteristics in the KCAT was 0.69. The mean DCV score for the total instrument for the nursing diagnosis Alteration in Tissue Perfusion: Cardiac was 0.70. This value exceeds the 0.60 criteria recommended by Fehring (1986) for validation of a nursing diagnosis.

Table 2

Content Validity Ratings of Subjective Defining Characteristics of the Nursing Diagnosis of Alteration in Tissue Perfusion: Cardiac (N=20)

<u>Defining Characteristic</u>	<u>Mean*</u>	<u>Standard Deviation</u>
1. Verbalizes chest pain	0.89	0.20
2. Verbalizes history of chest pain	0.75	0.20
3. Verbalizes chest discomfort	0.86	0.13
4. Verbalizes history of chest discomfort	0.71	0.09
5. Verbalizes chest pressure	0.82	0.19
6. Verbalizes history of chest pressure	0.68	0.19
7. Verbalizes chest tightness	0.86	0.20
8. Verbalizes history of chest tightness	0.71	0.17
9. Verbalizes relief of chest pain with administration of nitrates	0.86	0.20
10. Verbalizes neck pain	0.64	0.13
11. Verbalizes history of neck pain	0.60	0.13
12. Verbalizes jaw pain	0.68	0.19
13. Verbalizes history of jaw pain	0.64	0.20
14. Verbalizes shoulder pain	0.68	0.19
15. Verbalizes history of shoulder pain	0.61	0.13

table continues

<u>Defining Characteristic</u>	<u>Mean*</u>	<u>Standard Deviation</u>
16. Verbalizes arm pain	0.75	0.20
17. Verbalizes history of arm pain	0.64	0.20
18. Verbalizes neck discomfort	0.68	0.19
19. Verbalizes history of neck discomfort	0.57	0.19
20. Verbalizes jaw discomfort	0.71	0.23
21. Verbalizes history of jaw discomfort	0.61	0.24
22. Verbalizes shoulder discomfort	0.68	0.19
23. Verbalizes history of shoulder discomfort	0.57	0.19
24. Verbalizes arm discomfort	0.75	0.20
25. Verbalizes history of arm discomfort	0.64	0.20
26. Verbalizes indigestion	0.75	0.14
27. Verbalizes history of indigestion	0.61	0.28
28. Verbalizes nausea	0.71	0.23
29. Verbalizes history of nausea	0.61	0.28
30. Verbalizes shortness of breath	0.79	0.23
31. Verbalizes history of shortness breath	0.68	0.19

\*Note. 0.00=Not at all important; 0.25=not very important; 0.50= somewhat important; 0.75=quite important; 1.00=very important



Table 3

Content Validity Ratings of Objective Defining Characteristics of the Nursing Diagnosis Alteration in Tissue Perfusion: Cardiac (N=20)

<u>Defining Characteristic</u>	<u>Mean*</u>	<u>Standard Deviation</u>
32. Significant ECG ST segment depression (more than 1 mm below baseline) in two or more continuous leads	0.79	0.23
33. Significant ECG ST segment elevation (more than 1 mm above baseline) in two or more continuous leads	0.89	0.13
34. Presence of CPK <sub>MB</sub> or CPK <sub>2</sub> enzymes within the first three drawn blood samples or within the first 48 hours of admission	0.89	0.20
35. Presence of significant Q wave on ECG (more than 1 mm deflection from baseline) in two or more continuous leads	0.75	0.25
36. Atrial Arrhythmias	0.57	0.28
37. Ventricular Arrhythmias	0.71	0.17

table continues

<u>Defining Characteristic</u>	<u>Mean*</u>	<u>Standard Deviation</u>
38. Sinus Tachycardia (Heart rate $\geq$ 100 beats/minute found in two or more separate readings)	0.54	0.19
39. Hypertension (blood pressure $\geq$ 140/90 mmHg found in two or more separate readings)	0.58	0.20
40. Presence of S <sub>4</sub> heart sound that resolves with the cessation of chest pain	0.60	0.14
41. Tachypnea (Respirations of $\geq$ 26 breaths/minute found in two or more separate readings)	0.57	0.24
42. Diaphoresis	0.68	0.24

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\*Note. 0.00=Not at all important; 0.25=not very important; 0.50=somewhat important; 0.75=quite important; 1.00=very important

### Interrater Reliability

The investigator and a clinical nurse expert assessed a total of six patients to attain initial estimate of interrater reliability. Interrater reliability was established following assessment of the initial three patients by both raters. The most frequent interrater disagreements were found in the "degree of importance" section of the KCAT. Following review and discussion of the assessment method and the use of the KCAT, the raters independently assessed three additional patients. Percent agreement between raters was 91.8%, 96.5%, and 95.3%.

The subjective portion of the KCAT was completed by the raters from information obtained from patient interviews. If patients experienced pain the rater judged they were also experiencing discomfort and therefore, both characteristics, pain and discomfort, were judged to be present. However, a patient could experience discomfort without experiencing pain. In this case, only the discomfort characteristic would be judged as being present.

The raters judged the presence of objective defining characteristics in a similar manner. If an atrial or ventricular arrhythmia was isolated, it was scored as not being present. The nurse raters evaluated the degree of importance of each defining characteristic whether the defining characteristic was present in the patient or not.

Interrater reliability values between the two raters

were calculated for each defining characteristic for each of the twenty subjects used in the study. Interrater reliability measurement for thirty-eight (89%) of the defining characteristics of the KCAT were greater than 0.90. The interrater reliability measurement for the remaining 5 (11%) defining characteristics ranged from 0.75 to 0.85.

#### Clinical Diagnostic Validity (CDV) Scores

Fehring's (1986) Clinical Diagnostic Validity (CDV) model was used for this study. The CDV model yields two types of scores: the individual CDV score and the total CDV score. The individual CDV score is calculated for each defining characteristic by using the following formula.

$$R = [ A/A + D ] \times [(F_1/N + F_2/N)/2]$$

Where

- A = Number of agreements
- D = Number of disagreements
- F<sub>1</sub> = Frequency of characteristics observed by the first observer
- F<sub>2</sub> = Frequency of characteristics observed by the second observer
- N = Number of subjects observed
- R = Individual CDV score

Table 4 presents the mean individual CDV scores for each subjective defining characteristic of the KCAT as determined in the clinical sample by the nurse raters for 20 subjects. Table 5 displays the mean individual CDV scores for each of the objective defining characteristics of the KCAT.

Table 4

Individual Clinical Diagnostic Validation Scores for the  
Subjective Defining Characteristics (N=20)

<u>Defining Characteristic</u>	<u>Individual CDV Score</u>
1. Verbalizes chest pain	0.63
2. Verbalizes history of chest pain	0.55
3. Verbalizes chest discomfort	0.78
4. Verbalizes history of chest discomfort	0.54
5. Verbalizes chest pressure	0.59
6. Verbalizes history of chest pressure	0.45
7. Verbalizes chest tightness	0.45
8. Verbalizes history chest tightness	0.40
9. Verbalizes relief of chest pain with administration of nitrates	0.78
10. Verbalizes neck pain	0.25
11. Verbalizes history of neck pain	0.17
12. Verbalizes jaw pain	0.17
13. Verbalizes history of jaw pain	0.12
14. Verbalizes shoulder pain	0.50
15. Verbalizes history of shoulder pain	0.31
16. Verbalizes arm pain	0.62
17. Verbalizes history of arm pain	0.31
18. Verbalizes neck discomfort	0.26
19. Verbalizes history of neck discomfort	0.20

table continues

<u>Defining Characteristic</u>	<u>Individual CDV Score</u>
20. Verbalizes jaw discomfort	0.18
21. Verbalizes history of jaw discomfort	0.09
22. Verbalizes shoulder discomfort	0.50
23. Verbalizes history of shoulder discomfort	0.31
24. Verbalizes arm discomfort	0.70
25. Verbalizes history of arm discomfort	0.36
26. Verbalizes indigestion	0.32
27. Verbalizes history of indigestion	0.28
28. Verbalizes nausea	0.50
29. Verbalizes history of nausea	0.23
30. Verbalizes shortness of breath	0.65
31. Verbalizes history of shortness of breath	0.45

Note. Individual CDV score of  $\geq 0.80$  qualifies as a major defining characteristic;  $\leq 0.79$  to  $\geq 0.50$  qualifies as a minor defining characteristic (Fehring 1987).

Table 5

Individual Clinical Diagnostic Validation Scores for  
Objective Defining Characteristics (N=20)

<u>Defining Characteristic</u>	<u>Individual Item Score</u>
32. Significant ECG ST segment depression (more than 1 mm below baseline in two or more continuous leads)	0.30
33. Significant ECG ST segment elevation (more than 1 mm above baseline in two or more continuous leads)	0.40
34. Presence of CPK <sub>MB</sub> or CPK <sub>2</sub> within the first three drawn blood samples within the first 48 hours of admission	0.84
35. Presence of significant Q waves on ECG (more than 1 mm deflection from baseline in two or more continuous leads)	0.31
36. Atrial arrhythmias	0.07
37. Ventricular arrhythmias	0.07

table continues

<u>Defining Characteristic</u>	<u>Individual CDV Score</u>
38. Sinus tachycardia (Heart rate $\geq$ 100 beats per minute found in two or more separate readings)	0.10
39. Hypertension (Systolic blood pressure $\geq$ 140mmHg found in two or more separate readings)	0.49
40. Hypertension (Diastolic blood pressure $\geq$ 90mmHg found in two or more separate readings)	0.41
41. Presence of S <sub>4</sub> heart sound that resolves with cessation of chest pain	0.05
42. Tachypnea (Respirations of $\geq$ 26 breaths per minute)	0.02
43. Diaphoresis	0.55

---

Note. Individual CDV score of  $\geq$  0.80 qualifies as a major defining characteristic;  $\leq$  0.79 to  $\geq$  0.50 qualifies as a minor defining characteristic (Fehring 1987).



Fehring (1987) recommended that any defining characteristic with an individual CDV score of  $\geq 0.80$  qualifies as a major defining characteristic. Fehring (1987) recommended that those defining characteristics with individual CDV scores between  $\leq 0.79$  and  $\geq 0.50$  qualify as minor defining characteristics, while defining characteristics with an individual CDV score of  $\leq 0.50$  be discarded.

Due to exploratory nature of this study those defining characteristics with individual CDV scores between  $\leq 0.25$  and  $\geq 0.49$  were retained for further testing. Defining characteristics with individual CDV scores of  $\geq 0.25$  were ranked from the highest score to the lowest score. Twelve defining characteristics that attained an individual CDV score of  $\leq 0.25$  were discarded.

Table 6 presents the ranking of the subjective defining characteristics according to their mean individual CDV scores. No subjective defining characteristic attained a mean individual CDV score of 0.80 or above. However, 12 subjective defining characteristics achieved a mean individual CDV score of  $\geq 0.50$ . Therefore, there were no major subjective defining characteristics identified but 12 subjective minor defining characteristics were clinically validated.

Table 7 displays the ranking of objective defining characteristics according to their mean individual CDV

scores. Of the objective defining characteristics one defining characteristic, "presence of CPK<sub>MB</sub> or CPK<sub>2</sub> within the first three drawn blood samples within the first 48 hours of admission", qualified as a major defining characteristic and one defining characteristic, "Diaphoresis", qualified as a minor defining characteristic.

Table 6

Ranking of Subjective Defining Characteristics According to Individual CDV Scores (N=20)

<u>Defining Characteristic</u>	<u>Individual CDV Score</u>
1. Verbalizes chest discomfort	0.78
2. Verbalizes relief of chest pain with administration of nitrates	0.78
3. Verbalizes arm discomfort	0.70
4. Verbalizes shortness of breath	0.65
5. Verbalizes chest pain	0.63
5. Verbalizes arm pain	0.62
6. Verbalizes chest pressure	0.59
7. Verbalizes history of chest pain	0.55
8. Verbalizes history of chest discomfort	0.54
9. Verbalizes shoulder discomfort	0.50
10. Verbalizes shoulder pain	0.50
11. Verbalizes nausea	0.50
12. Verbalizes chest tightness	0.45
13. Verbalizes history of shortness of breath	0.45
14. Verbalizes history of chest pressure	0.45
15. Verbalizes history chest tightness	0.40
16. Verbalizes history of arm discomfort	0.36
17. Verbalizes indigestion	0.32

table continues

<u>Defining Characteristic</u>	<u>Individual CDV Score</u>
18. Verbalizes history of arm pain	0.31
19. Verbalizes history of shoulder discomfort	0.31
20. Verbalizes history of shoulder pain	0.31
21. Verbalizes history of indigestion	0.28
22. Verbalizes neck discomfort	0.26
23. Verbalizes neck pain	0.25

---

Table 7

Ranking of Objective Defining Characteristics According to Individual CDV Scores

<u>Defining Characteristic</u>	<u>Individual Item Score</u>
1. Presence of CPK <sub>MB</sub> or CPK <sub>2</sub> within the first three drawn blood samples within the first 48 hours of admission	0.84
2. Diaphoresis	0.55
3. Hypertension (Systolic blood pressure $\geq$ 140mmHg found in two or more separate readings)	0.49
4. Hypertension (Diastolic blood pressure $\geq$ 90mmHg found in two or more separate readings)	0.41
5. Significant ECG ST segment elevation (more than 1mm above baseline in two or more continuous leads)	0.40
6. Presence of significant Q waves on ECG (more than 1mm deflection from baseline in two or more continuous leads)	0.31

table continues

<u>Defining Characteristic</u>	<u>Individual CDV Score</u>
7. Significant ECG ST segment depression (more than 1 mm below baseline in two or more continuous leads)	0.30

---

Mean individual CDV scores of  $\geq 0.50$  were used to determine the cluster of clinically validated defining characteristics. Table 8 presents the final cluster of 14 clinically validated defining characteristics for the nursing diagnosis of Alteration in Tissue Perfusion: Cardiac. Table 9 presents those defining characteristics with mean individual CDV scores between  $\geq 0.25$  and  $\leq 0.49$  retained for further testing.

The total CDV score was determined by summing and averaging the mean individual CDV scores of clinically validated defining characteristics whose mean score was  $\geq 0.50$ . The total CDV score represents the CDV score for the nursing diagnosis as a whole.

The total CDV score for the nursing diagnosis Alteration in Tissue Perfusion: Cardiac as measured by the KCAT was 0.62. The total CDV score meets the 0.60 criteria proposed by Fehring (1986) for validation of a nursing diagnosis.

Table 8

The Cluster of Clinically Validated Defining Characteristics  
for the Nursing Diagnosis Alteration in Tissue Perfusion:  
Cardiac (N=20)

Defining Characteristic	Individual CVD Score
1. Presence of CPK <sub>MB</sub> or CPK <sub>2</sub> within the first three drawn blood samples within the first 48 hours of admission	0.84
2. Verbalizes chest discomfort	0.78
3. Verbalizes relief of chest pain with administration of nitrates	0.78
4. Verbalizes arm discomfort	0.70
5. Verbalizes shortness of breath	0.65
6. Verbalizes chest pain	0.63
7. Verbalizes arm pain	0.62
8. Verbalizes chest pressure	0.59
9. Verbalizes history of chest pain	0.55
10. Diaphoresis	0.55
11. Verbalizes history of chest discomfort	0.54
12. Verbalizes shoulder discomfort	0.50
13. Verbalizes shoulder pain	0.50
14. Verbalizes nausea	0.50

---



Table 9

Defining Characteristics Retained for Further Testing (N=20)

<u>Defining Characteristic</u>	<u>Individual CVD Score</u>
1. Hypertension (Systolic blood pressure $\geq$ 140mmHg found in two or more separate readings)	0.49
2. Verbalizes chest tightness	0.45
3. Verbalizes history of shortness of breath	0.45
4. Verbalizes history of chest pressure	0.45
5. Hypertension (Diastolic blood pressure $\geq$ 90mmHg found in two or more separate readings)	0.41
6. Significant ECG ST segment elevation (more than 1mm above baseline in two or more continuous leads)	0.40
7. Verbalizes history chest tightness	0.40
8. Verbalizes history of arm discomfort	0.36
9. Verbalizes indigestion	0.32
10. Presence of significant Q waves on ECG (more than 1mm deflection from baseline in two or more continuous leads)	0.31

table continues

<u>Defining Characteristic</u>	<u>Individual CDV Score</u>
11. Verbalizes history of arm pain	0.31
12. Verbalizes history of shoulder discomfort	0.31
13. Verbalizes history of shoulder pain	0.31
14. Significant ECG ST segment depression (more than 1 mm below baseline in two or more continuous leads)	0.30
15. Verbalizes history of indigestion	0.28
16. Verbalizes history of neck discomfort	0.26
17. Verbalizes history of neck pain	0.25

---

### Degree of Importance of Defining Characteristics

The importance of the defining characteristic to the nursing diagnosis Alteration in Tissue Perfusion: Cardiac was judged by each nurse rater. Raters assessed the degree of importance on a five point Likert-type scale ranging from a value of 1, not at all important to a value of 5, very important. Rankings were converted for computation as follows: a) 1=0.00, b) 2=0.25, c) 3=0.50, d) 4=0.75, and e) 5=1.00.

The clinical mean ratings of the degree of importance of each subjective defining characteristic to the nursing diagnosis according to nurse rater 1 is presented in table 10. Table 11 presents the clinical mean ratings of the degree of importance of the objective defining characteristics according to nurse rater 1. Table 12 presents the clinical mean ratings of the degree of importance of the subjective defining characteristics according to nurse rater 2. The clinical mean ratings of the degree of importance of the objective defining characteristics as judged by nurse rater 2 is presented in Table 13.

Of the 31 subjective defining characteristics, items numbered 1-9 on the KCAT attained clinical mean scores of more than 0.95 and, therefore, judged to be very important by both nurse raters. Fifteen subjective defining characteristics had clinical mean rating between  $\geq 0.50$  and

$\leq 0.75$  and were judged as somewhat important by both nurse raters.

The clinical mean rating of the objective defining characteristic, "Presence of CPK<sub>MB</sub> or CPK<sub>2</sub> within the first three drawn blood samples within the first 48 hours of admission", was 0.99 as judged by both nurse raters to qualify as very important. The mean rating of the objective defining characteristic, "Presence of significant Q waves on ECG (more than 1mm deflection from baseline in two or more continuous leads)" was 0.81 as judged by both nurse raters to qualify as being quite important. Of the remaining 10 objective defining characteristics 5 had clinical mean rating between  $\geq 0.50$  and  $\leq 0.75$  as judged by both nurse raters to qualify as somewhat important.

Table 10

Degree of Importance of Subjective Defining Characteristics  
to the Nursing Diagnosis as Rated by Nurse Rater 1 (N=20)

<u>Defining Characteristic</u>	<u>Mean*</u>	<u>Standard Deviation</u>
1. Verbalizes chest pain	0.96	0.12
2. Verbalizes history of chest pain	0.98	0.11
3. Verbalizes chest discomfort	0.99	0.06
4. Verbalizes history of chest discomfort	0.98	0.11
5. Verbalizes chest pressure	0.99	0.06
6. Verbalizes history of chest pressure	0.98	0.11
7. Verbalizes chest tightness	0.98	0.11
8. Verbalizes history chest tightness	0.98	0.11
9. Verbalizes relief of chest pain with administration of nitrates	0.96	0.13
10. Verbalizes neck pain	0.55	0.15
11. Verbalizes history of neck pain	0.50	0.08
12. Verbalizes jaw pain	0.51	0.10
13. Verbalizes history of jaw pain	0.49	0.06
14. Verbalizes shoulder pain	0.59	0.19
15. Verbalizes history of shoulder pain	0.54	0.12

table continues

<u>Defining Characteristic</u>	<u>Mean*</u>	<u>Standard Deviation</u>
16. Verbalizes arm pain	0.65	0.17
17. Verbalizes history of arm pain	0.56	0.11
18. Verbalizes neck discomfort	0.53	0.11
19. Verbalizes history of neck discomfort.	0.50	0.08
20. Verbalizes jaw discomfort	0.50	0.08
21. Verbalizes history of jaw discomfort	0.48	0.06
22. Verbalizes shoulder discomfort	0.56	0.16
23. Verbalizes history of shoulder discomfort	0.53	0.11
24. Verbalizes arm discomfort	0.61	0.15
25. Verbalizes history of arm discomfort	0.50	0.14
26. Verbalizes indigestion	0.30	0.13
27. Verbalizes history of indigestion	0.28	0.14
28. Verbalizes nausea	0.38	0.19
29. Verbalizes history of nausea	0.30	0.10
30. Verbalizes shortness of breath	0.59	0.22
31. Verbalizes history of shortness of breath	0.46	0.25

\*Note. 0.00=Not at all important; 0.25=not very important; 0.50=somewhat important; 0.75=quite important; 1.00=very important

Table 11

Degree of Importance of Objective Defining Characteristics  
as Rated by Nurse Rater 1 (N=20)

<u>Defining Characteristic</u>	<u>Mean*</u>	<u>Standard Deviation</u>
32. Significant ECG ST segment depression (more than 1 mm below baseline in two or more continuous leads)	0.66	0.25
33. Significant ECG ST segment elevation (more than 1 mm above baseline in two or more continuous leads)	0.70	0.22
34. Presence of CPK <sub>MB</sub> or CPK <sub>2</sub> within the first three drawn blood samples within the first 48 hours of admission	0.99	0.06
35. Presence of significant Q waves on ECG (more than 1mm deflection from baseline in two or more continuous leads)	0.81	0.24
36. Atrial arrhythmias	0.26	0.06
37. Ventricular arrhythmias	0.34	0.23

table continues

<u>Defining Characteristic</u>	<u>Mean*</u>	<u>Standard Deviation</u>
38. Sinus tachycardia (Heart rate $\geq$ 100 beats per minute found in two or more separate readings)	0.28	0.08
39. Hypertension (Systolic blood pressure $\geq$ 140mmHg found in two or more separate readings)	0.68	0.14
40. Hypertension (Diastolic blood pressure $\geq$ 90mmHg found in two or more separate readings)	0.65	0.17
41. Presence of S <sub>4</sub> heart sound that resolves with cessation of chest pain	0.49	0.06
42. Tachypnea (Respirations of $\geq$ 26 breaths per minute)	0.25	0.08
43. Diaphoresis	0.55	0.47

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\*Note. 0.00=Not at all important; 0.25=not very important; 0.50=somewhat important; 0.75=quite important; 1.00=very important



Table 12

Degree of Importance of the Subjective Defining Characteristics to the Nursing Diagnosis as Rated by Nurse Rater 2 (N=20)

<u>Defining Characteristic</u>	<u>Mean*</u>	<u>Standard Deviation</u>
1. Verbalizes chest pain	1.00	0.00
2. Verbalizes history of chest pain	1.00	0.00
3. Verbalizes chest discomfort	1.00	0.00
4. Verbalizes history of chest discomfort	1.00	0.00
5. Verbalizes chest pressure	1.00	0.00
6. Verbalizes history of chest pressure	1.00	0.00
7. Verbalizes chest tightness	1.00	0.00
8. Verbalizes history chest tightness	1.00	0.00
9. Verbalizes relief of chest pain with administration of nitrates	1.00	0.00
10. Verbalizes neck pain	0.58	0.15
11. Verbalizes history of neck pain	0.55	0.10
12. Verbalizes jaw pain	0.53	0.08
13. Verbalizes history of jaw pain	0.54	0.09
14. Verbalizes shoulder pain	0.63	0.13
15. Verbalizes history of shoulder pain	0.60	0.13

table continues

<u>Defining Characteristic</u>	<u>Mean*</u>	<u>Standard Deviation</u>
16. Verbalizes arm pain	0.69	0.14
17. Verbalizes history of arm pain	0.61	0.13
18. Verbalizes neck discomfort	0.56	0.11
19. Verbalizes history of neck discomfort.	0.55	0.10
20. Verbalizes jaw discomfort	0.50	0.00
21. Verbalizes history of jaw discomfort	0.50	0.00
22. Verbalizes shoulder discomfort	0.54	0.09
23. Verbalizes history of shoulder discomfort	0.56	0.11
24. Verbalizes arm discomfort	0.56	0.11
25. Verbalizes history of arm discomfort	0.53	0.11
26. Verbalizes indigestion	0.35	0.17
27. Verbalizes history of indigestion	0.29	0.09
28. Verbalizes nausea	0.36	0.17
29. Verbalizes history of nausea	0.31	0.11
30. Verbalizes shortness of breath	0.59	0.25
31. Verbalizes history of shortness of breath	0.50	0.26

\*Note. 0.00=Not at all important; 0.25=not very important;  
0.50=somewhat important; 0.75=quite important; 1.00=very  
important

Table 13

Degree of Importance of the Objective Defining Characteristics as Rated by Nurse Rater 2 (N=20)

<u>Defining Characteristic</u>	<u>Mean*</u>	<u>Standard Deviation</u>
32. Significant ECG ST segment depression (more than 1 mm below baseline in two or more continuous leads)	0.66	0.25
33. Significant ECG ST segment elevation (more than 1 mm above baseline in two or more continuous leads)	0.71	0.23
34. Presence of CPK <sub>MB</sub> or CPK <sub>2</sub> within the first three drawn blood samples within the first 48 hours of admission	0.99	0.06
35. Presence of significant Q waves on ECG (more than 1mm deflection from baseline in two or more continuous leads)	0.81	0.26
36. Atrial arrhythmias	0.31	0.20
37. Ventricular arrhythmias	0.33	0.20

table continues

<u>Defining Characteristic</u>	<u>Mean*</u>	<u>Standard Deviation</u>
38. Sinus tachycardia (Heart rate $\geq$ 100 beats per minute found in two or more separate readings)	0.28	0.11
39. Hypertension (Systolic blood pressure $\geq$ 140mmHg found in two or more separate readings)	0.61	0.15
40. Hypertension (Diastolic blood pressure $\geq$ 90mmHg found in two or more separate readings)	0.64	0.13
41. Presence of S <sub>4</sub> heart sound that resolves with cessation of chest pain	0.53	0.08
42. Tachypnea (Respirations of $\geq$ 26 breaths per minute)	0.26	0.06
43. Diaphoresis	0.54	0.50

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\*Note. 0.00=Not at all important; 0.25=not very important; 0.50=somewhat important; 0.75=quite important; 1.00=very important

The mean ratings of the degree of importance of the cluster of clinically validated defining characteristics for each nurse rater was averaged to obtain the mean of means. The mean of means (the average of the rating of the degree of importance by the two nurse raters) were compared with the mean individual CDV score of the cluster of clinically validated defining characteristics.

Table 14 shows the comparison of the mean individual CDV score and the mean of means of the nurse raters' rating of degree of importance for the ranked clinically validated defining characteristics. Seven of the clinically validated defining characteristics had a mean of means of degree of importance of  $\geq 0.98$  to qualify as being very important. Six of the clinically validated defining characteristics had mean of means between  $\geq 0.50$  and  $\leq 0.75$  to qualify as somewhat important. One clinically validated defining characteristic, "Verbalizes nausea" had a mean of means of 0.37 to qualify as not very important.

Table 14

Comparison of Mean CDV and Mean of Means of Degree of Importance of Both Nurse Raters of the Clinically Validated Defining Characteristics (N=20)

<u>Defining Characteristic</u>	<u>Mean of Means*</u>	<u>Individual CDV Score</u>
1. Presence of CPK <sub>MB</sub> or CPK <sub>2</sub> within the first three drawn blood samples within the first 48 hours of admission	0.99	0.84
2. Verbalizes chest discomfort	1.00	0.78
3. Verbalizes relief of chest pain with administration of nitrates	0.98	0.78
4. Verbalizes arm discomfort	0.59	0.70
5. Verbalizes shortness of breath	0.59	0.65
6. Verbalizes chest pain	0.98	0.63
7. Verbalizes arm pain	0.67	0.62
8. Verbalizes chest pressure	1.00	0.59
9. Verbalizes history of chest pain	0.99	0.55
10. Diaphoresis	0.55	0.55
11. Verbalizes history of chest discomfort	0.99	0.54

table continues

<u>Defining Characteristic</u>	<u>Mean of Means*</u>	<u>Individual CDV Score</u>
12. Verbalizes shoulder discomfort	0.56	0.50
13. Verbalizes shoulder pain	0.61	0.50
14. Verbalizes nausea	0.37	0.50

---

\*Note. 0.00=Not at all important; 0.25=not very important; 0.50=somewhat important; 0.75=quite important; 1.00=very important

### Field Notes

During the subjective interviews the nurse raters often received comments from subjects about their angina that did not relate to any of the listed defining characteristics. These comments were recorded on the KCAT. The field notes were categorized and content analyzed. Table 16 presents a summary of the field note data. Nearly one third of the subjects verbalized experiencing diffuse perspiration while one quarter of the subjects reported numbness of arms and fingers. Twenty percent of the subjects characterized their chest or substernal pain as "burning".



Table 15

Summary of Field Note Categories (N=20)

<u>Complaint</u>	<u>Frequency</u>	<u>Percentage</u>
1. Verbalized experiencing diffuse perspiration	6	30%
2. Numbness of arm or fingers	5	25%
3. Burning pain: chest or substernal	4	20%
4. Chest aching	2	10%
5. Burning pain: throat and/or mouth	2	10%
6. Arm heaviness	2	10%

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### Summary

In Chapter 4, the results of data analysis were reported. The sample was described in relation to age, medical diagnosis, sex, and marital status. The Diagnostic Content Validity, and Clinical Diagnostic Validity of the individual items of the KCAT as well as the total tool were reported. Estimates of the means of the ratings of the degree of importance of objective and subjective defining characteristics for each nurse rater were reported. Finally, analysis of the anecdotal information collected by the nurse raters was reported.

## CHAPTER 5

### DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to identify and clinically validate defining characteristics of a proposed new nursing diagnosis Alteration in Tissue Perfusion: Cardiac. Findings related to the research questions posed in Chapter I are discussed. Conclusions, limitations, recommendations for future nursing research, and the significance of this study to nursing are presented.

#### DISCUSSION OF FINDINGS

##### Demographics

This study has a skewed sample of women (65%, n=13), which is not representative of the normal cardiac patient population. In a report reviewing women and heart disease, Murdaugh and O'Rourke (1988) reported that women under the age of sixty with coronary heart disease had angina as the initial clinical symptom substantially more than men, 56% compared to approximately 33%.

Women also, have a increased incidence of coronary artery spasm producing an imbalance of cardiac oxygen supply and demand. Alternatively, women tend to have more atypical chest pain and a higher incidence of silent MI's than men (Murdaugh & O'Rourke, 1988). The findings of this study need to viewed in the light of the skewed sample and the report by Murdaugh and O'Rourke (1988).

### Research Questions

The first research question addressed defining characteristics associated with the nursing diagnosis, Alteration in Tissue Perfusion: Cardiac. The Kelly Cardiac Assessment Tool, consisting of 43 defining characteristics associated with the proposed nursing diagnosis, was developed from the literature and examined for content validity based on Fehring's (1986) Diagnostic Content Validity (DCV) model. All 43 defining characteristics were retained for clinical testing. The total DCV score was 0.70.

The 43 defining characteristics were subjected to clinical testing using Fehring's (1986) Clinical Diagnostic Validity model. Of the 43 defining characteristics 14 had individual CDV score of  $\geq 0.50$ . They met the criteria suggested by Fehring to be accepted as clinically validated defining characteristics. The total CDV score for the KCAT was 0.62. Both the total DVC score and the total CDV score met the criteria suggested by Fehring for validation of the nursing diagnosis, Alteration in Tissue Perfusion: Cardiac.

The second research question addressed the identified defining characteristics clinically validated as major defining characteristics. The criteria for validation as a major defining characteristic is an individual CDV score of  $\geq 0.80$ . One characteristic, "the presence of CPK<sub>MB</sub> or CPK<sub>2</sub> within the first three blood samples drawn within the first

48 hours", qualified as a major defining characteristic (CDV score=0.84).

The third research question addressed the identified defining characteristics clinically validated as minor defining characteristics. Thirteen characteristics had individual CDV scores between  $\geq 0.50$  and  $\leq 0.79$ . They were clinically validated as minor defining characteristics.

To avoid premature closing due to the exploratory design of this study, defining characteristics with individual CDV scores between  $\leq 0.25$  and  $\geq 0.49$  were retained for further testing. One subjective defining characteristic, "Verbalizes shortness of breath", was clinically validated while the objective defining characteristic, "Tachypnea" attained a very low mean individual CDV score. Tachypnea needs to be re-defined and re-tested.

Field notes recorded at the time of clinical assessment were categorized and analyzed. In addition, during the data collection phase of the study the nurse raters observed the presence of four objective signs and symptoms that were not included in the KCAT as objective defining characteristics. The four objective characteristics observed frequently in patients were; a) T-wave with an opposite polarity of a normal sinus rhythm QRS complex on an electrocardiogram (ECG), b) bundle branch block on ECG, c) coronary artery lesions documented in the medical records by a physician who performed a cardiac catheterization, and d) re-perfusion

ventricular tachycardiac following infusion of streptokinase or tissue plasminogen activator. These four objective characteristics and the field note information categories need to be subjected to further review prior to future clinical testing.

#### **Discussion of Findings Related to Degree of Importance**

The section of the KCAT that measured the degree of importance of each defining characteristic to the nursing diagnosis demonstrated that the raters judged the subjective defining characteristics numbered 1-9 on the KCAT to be very important. Of the clinically validated defining characteristics, seven characteristics were judged to be very important by both raters. Six of the clinically validated defining characteristics were judged to be somewhat important. One clinically validated defining characteristic was judged to be not very important. Therefore, the clinical testing showed that 13 of the 14 the clinically validated defining characteristics were present and assessed to be either somewhat important or very important in formulating the nursing diagnosis by both raters.

#### **Conclusions**

One major and 13 minor defining characteristics for the nursing diagnosis, Alteration in Tissue Perfusion: Cardiac have been clinically validated. The KCAT tool CDV score of 0.62 and the DCV score of 0.70 exceeded the criteria for

validation of a new nursing diagnosis.

#### Limitations

The limitations of this study are as follows:

1. The small sample of 20 subjects.
2. The use of two nurse raters.
3. The individual CDV score of the subjective defining characteristics are restricted to subject bias and accurate recall.
4. The skewed sample of women (65%) in the study.

#### Recommendations

The KCAT needs to be revised to reflect the findings of this study. The subjective defining characteristics of pain and discomfort need to be combined. The retained defining characteristics with individual CDV scores between  $\geq 0.25$  and  $\leq 0.49$  need to be subjected to additional clinical testing. The four objective characteristics observed by the nurse raters need to be included in the KCAT and clinically tested. The objective characteristic of Tachypnea needs to be re-defined to: Observed rapid respirations at  $\geq 22$  breaths per minute, and re-tested. The 6 signs and symptoms that were identified in the field notes need to be examined for possible inclusion into the KCAT for testing. Future testing of KCAT needs to be done with a sample that is more representative of a normal cardiac population.

To achieve a geographic representation, the content validity of the revised KCAT needs to be re-tested using

Fehring's (1986) DCV model by having cardiovascular nurse experts across the country rate the items for content validity. The revised KCAT needs to be re-tested using Fehring's CDV model with a larger sample using multiple settings. The number of nurse raters using the KCAT to evaluate subjects needs to be expanded to include staff nurses caring for the cardiovascular patient.

Fehring (1986) proposed three types of standardized tests of validity be provided for each nursing diagnosis in the Nursing Diagnosis Taxonomy. The three standardized tests of validity are the diagnostic content validity (DCV), the clinical diagnostic validity (CDV), and the etiological correlation ratings (ECR). The ECR is a correlational model used to predict the etiology's ability to predict the existence of a nursing diagnosis (Fehring, 1986). Etiologies for Alteration in Tissue Perfusion: Cardiac need to be identified and tested to complete the three validation tests for the nursing diagnosis.

#### **Significance to Nursing**

Nursing diagnoses provide the nomenclature which reflects the body of scientific knowledge unique to nursing. This study used two previously tested validation models to provide evidence to support the clinical validation of Alteration in Tissue Perfusion: Cardiac. In the validation process a new diagnostic tool, the KCAT, was designed, content validated, and clinically tested. The clinical



validation of Alteration in Tissue Perfusion: Cardiac will assist nurses to identify defining characteristics associated with the patient's response to alteration in cardiac tissue perfusion and communicate their findings in a consistent manner. In addition, nurses will have empirically based data on which to direct, document, and evaluate care of patients with Alteration in Tissue Perfusion: Cardiac.

#### Summary

This chapter provided a discussion of the significant findings of this study. The conclusions of the study were presented. The limitations of the study were identified. Recommendations for future nursing research were discussed. Finally, the significance of the findings of this nursing research to nursing was presented.

## HUMAN SUBJECTS APPROVAL LETTER



## The University of Arizona

Human Subjects Committee  
 1690 N. Warren (Bldg. 528B)  
 Tucson, Arizona 85724  
 (602) 626-8721 or 626-7575

23 May 1989

David J. Kelly, B.S.N., R.N.  
 c/o Anne Woodtli, Ph.D.  
 College of Nursing  
 Arizona Health Sciences Center

RE: A89.53 THE IDENTIFICATION AND CLINICAL VALIDATION OF THE DEFINING  
 CHARACTERISTICS OF THE NURSING DIAGNOSIS, ALTERATION IN TISSUE  
 PERFUSION: CARDIAC

Dear Mr. Kelly:

We received the revised consent form for your above cited project. The procedures to be followed in this study pose no more than minimal risk to participating subjects. Regulations issued by the U.S. Department of Health and Human Services [45 CFR Part 46.110(b)] authorize approval of this type project through the expedited review procedures, with the condition(s) that subjects' anonymity be maintained. Although full Committee review is not required, a brief summary of the project procedures is submitted to the Committee for their endorsement and/or comment, if any, after administrative approval is granted. This project is approved effective 23 May 1989.

The Human Subjects Committee (Institutional Review Board) of the University of Arizona has a current assurance of compliance, number M-1233, which is on file with the Department of Health and Human Services and covers this activity.

Approval is granted with the understanding that no changes or additions will be made either to the procedures followed or to the consent form(s) used (copies of which we have on file) without the knowledge and approval of the Human Subjects Committee and your College or Departmental Review Committee. Any research related physical or psychological harm to any subject must also be reported to each committee.

A university policy requires that all signed subject consent forms be kept in a permanent file in an area designated for that purpose by the Department Head or comparable authority. This will assure their accessibility in the event that university officials require the information and the principal investigator is unavailable for some reason.

Sincerely yours,

*Milan Novak*

Milan Novak, M.D., Ph.D.  
 Chairman  
 Human Subjects Committee

MN/ms

cc: Departmental/College Review Committee

## Appendix B

## Subject's Consent Form

The Identification and Clinical Validation of the Nursing Diagnosis Alteration in Tissue Perfusion: Cardiac

I AM BEING ASKED TO READ THE FOLLOWING MATERIAL TO ENSURE THAT I AM INFORMED TO THE NATURE OF THIS RESEARCH STUDY AND OF HOW I WILL PARTICIPATE IN IT, IF I CONSENT TO DO SO. SIGNING THIS FORM WILL INDICATE THAT I HAVE BEEN SO INFORMED AND THAT I GIVE MY CONSENT. FEDERAL REGULATIONS REQUIRE WRITTEN INFORMED CONSENT PRIOR TO PARTICIPATION IN THIS RESEARCH STUDY SO THAT I CAN KNOW THE NATURE AND THE RISKS OF MY PARTICIPATION AND CAN DECIDE TO PARTICIPATE OR NOT PARTICIPATE IN A FREE AND INFORMED MANNER.

Purpose

I am being invited to voluntarily participate in the above titled research project. The purpose of this project is to study how well a list of symptoms fits my medical condition. This may help nurses take better care of patients with heart problems.

Selection Criteria

I have been invited to participate because I meet all of the inclusion criteria listed below.

1. I am 18 years old or older.
2. I have a medical diagnosis of angina (heart pain), unstable angina, myocardial infarction (heart attack), or rule out myocardial infarction.
3. I have remained in the hospital for at least 48 hours or until three blood samples of cardiac enzymes have been drawn.

Standard Treatment(s)

My decision to participate or not to participate in this research project will not affect the standard treatment available to me.

Procedure

If I agree to participate, I will be asked to agree to the following:

1. Submit to an examination that will consist of listening to my chest and back with a stethoscope, examining my feet and ankles by sight and touch for swelling, and possibly taking my blood pressure. This examination will be done by two different nurse investigators.
2. Allow the two nurse investigators examine my medical records.

Risks

There are no known risks involved in my participating in this research project.

Benefits

There are no known benefits to be derived from my participation in this research project.

Confidentiality

Your name will not be used in any report of this study. Your case will be assigned a number and only the number will be used in any future publication of this study. Only the two nurse investigators and the research project chairman will have access to the information you provide.

Costs

There will be no costs to me and I will not be paid for participation in this study.

Authorization

Before giving my consent by signing this form, the methods, inconveniences, risks, and benefits have been explained to me and my questions have been answered. I understand that I may ask questions at any time and that I am free to withdraw from the project at any time without causing bad feelings or affecting my medical care. My participation in this project may be ended by the investigator or by the sponsor for reasons that would be explained. New information developed during the course of this study which may affect my willingness to continue in this research project will be given to me as it becomes available. I understand that this consent form will be filed in an area designated by the Human Subjects Committee with access restricted to the principal investigator, David J. Kelly, or authorized representative the Nursing department. I understand that I do not give up any of my legal rights by signing this form. A copy of this consent form will be given to me.

\_\_\_\_\_  
Subject's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Parent/Guardian (if necessary)

Investigator's Endorsement

I have carefully explained to the subject the nature or the above project. I hereby certify that to the best of my knowledge the person who is signing this consent form understands clearly the nature, demands, benefits, and risks involved in his/her participation. A medical problem or language or educational barrier has not precluded this understanding.

\_\_\_\_\_  
Signature of Investigator

\_\_\_\_\_  
Date

## APPENDIX C

THE CONTENT VALIDITY TOOL TO EVALUATE THE KELLY CARDIAC ASSESSMENT TOOL (KCAT)Subjective Defining Characteristics  
of Alteration in Tissue Perfusion: Cardiac

<u>Clarity</u>		<u>Defining Characteristic</u>	(1=not at all characteristic, 2=very little characteristic 3=somewhat characteristic, 4=quite characteristic, 5=very characteristic)				
			Relevancy to Patient Experiencing an Imbalance of Cardiac Oxygen Supply				
			<u>Degree of Relevancy</u>				
1.	Yes No	Verbalizes chest pain	1	2	3	4	5
2.	Yes No	Verbalizes history of chest pain	1	2	3	4	5
3.	Yes No	Verbalizes chest discomfort	1	2	3	4	5
4.	Yes No	Verbalizes history of chest discomfort	1	2	3	4	5
5.	Yes No	Verbalizes chest pressure	1	2	3	4	5
6.	Yes No	Verbalizes history of chest pressure	1	2	3	4	5
7.	Yes No	Verbalizes chest tightness	1	2	3	4	5
8.	Yes No	Verbalizes history of chest tightness	1	2	3	4	5
9.	Yes No	Verbalizes relief of chest pain with administration of nitrates	1	2	3	4	5
10.	Yes No	Verbalizes neck pain	1	2	3	4	5
11.	Yes No	Verbalizes history of neck pain	1	2	3	4	5
12.	Yes No	Verbalizes jaw pain	1	2	3	4	5
13.	Yes No	Verbalizes history of jaw pain	1	2	3	4	5

(1=not at all  
characteristic,  
2=very little  
characteristic  
3=somewhat  
characteristic,  
4=quite  
characteristic,  
5=very  
characteristic)

14.	Yes	No	Verbalizes shoulder pain	1	2	3	4	5
15.	Yes	No	Verbalizes history of shoulder pain	1	2	3	4	5
16.	Yes	No	Verbalizes arm pain	1	2	3	4	5
17.	Yes	No	Verbalizes history of arm pain	1	2	3	4	5
18.	Yes	No	Verbalizes neck discomfort	1	2	3	4	5
19.	Yes	No	Verbalizes history of neck discomfort	1	2	3	4	5
20.	Yes	No	Verbalizes jaw discomfort	1	2	3	4	5
21.	Yes	No	Verbalizes history of jaw discomfort	1	2	3	4	5
22.	Yes	No	Verbalizes shoulder discomfort	1	2	3	4	5
23.	Yes	No	Verbalizes history of shoulder discomfort	1	2	3	4	5
24.	Yes	No	Verbalizes arm discomfort	1	2	3	4	5
25.	Yes	No	Verbalizes history of arm discomfort	1	2	3	4	5
26.	Yes	No	Verbalizes indigestion	1	2	3	4	5
27.	Yes	No	Verbalizes history of indigestion	1	2	3	4	5
28.	Yes	No	Verbalizes nausea	1	2	3	4	5
29.	Yes	No	Verbalizes history of nausea	1	2	3	4	5
30.	Yes	No	Verbalizes shortness of breath	1	2	3	4	5
31.	Yes	No	Verbalizes history of shortness of breath	1	2	3	4	5

Objective Defining Characteristics of  
Alteration in Tissue Perfusion: Cardiac

(1=not at all  
characteristic,  
2=very little  
characteristic  
3=somewhat  
characteristic,  
4=quite  
characteristic,  
5=very  
characteristic)

Relevancy to Patient  
Experiencing an  
Imbalance of Cardiac  
Oxygen Supply

<u>Clarity</u>		<u>Defining Characteristic</u>	<u>Degree of Relevancy</u>				
32.	Yes No	Significant ECG ST segment depression (more than 1 mm below baseline)	1	2	3	4	5
33.	Yes No	Significant ECG ST segment elevation (more than 1 mm above baseline)	1	2	3	4	5
34.	Yes No	Presence of CPK <sub>MB</sub> or CPK <sub>2</sub> enzymes within the first three drawn blood samples or within the first 48 hours of admission	1	2	3	4	5
35.	Yes No	Presence of significant Q wave on ECG (more than 1 mm deflection from baseline)	1	2	3	4	5
36.	Yes No	Atrial Arrhythmias	1	2	3	4	5
37.	Yes No	Ventricular Arrhythmias	1	2	3	4	5
38.	Yes No	Sinus Tachycardia (Heart rate $\geq$ 100 beats/minute)	1	2	3	4	5
39.	Yes No	Hypertension (Blood pressure $\geq$ 140/90 mmHg)	1	2	3	4	5

(1=not at all  
characteristic,  
2=very little  
characteristic  
3=somewhat  
characteristic,  
4=quite  
characteristic,  
5=very  
characteristic)

40.	Yes	No	Presence of S <sub>4</sub> heart sound that resolves with the cessation of chest pain	1	2	3	4	5
41.	Yes	No	Tachypnea (Respirations of $\geq$ 26 breaths/minute)	1	2	3	4	5
42.	Yes	No	Diaphoresis	1	2	3	4	5



## APPENDIX D

THE KELLY CARDIAC ASSESSMENT TOOL (KCAT)Subjective Defining Characteristics  
of Alteration in Tissue Perfusion: Cardiac

<u>Present</u>	<u>Absent</u>	<u>Defining Characteristic</u>	<u>Degree of Importance</u>				
			(1=not at all important; 2=not very important; 3=somewhat important; 4=quite important; 5=very important)				
1. ( ) ( )	( )	Verbalizes chest pain	1	2	3	4	5
2. ( ) ( )	( )	Verbalizes history of chest pain	1	2	3	4	5
3. ( ) ( )	( )	Verbalizes chest discomfort	1	2	3	4	5
4. ( ) ( )	( )	Verbalizes history of chest discomfort	1	2	3	4	5
5. ( ) ( )	( )	Verbalizes chest pressure	1	2	3	4	5
6. ( ) ( )	( )	Verbalizes history of chest pressure	1	2	3	4	5
7. ( ) ( )	( )	Verbalizes chest tightness	1	2	3	4	5
8. ( ) ( )	( )	Verbalizes history of chest tightness	1	2	3	4	5
9. ( ) ( )	( )	Verbalizes relief of chest pain with administration of nitrates	1	2	3	4	5
10. ( ) ( )	( )	Verbalizes neck pain	1	2	3	4	5
11. ( ) ( )	( )	Verbalizes history of neck pain	1	2	3	4	5
12. ( ) ( )	( )	Verbalizes jaw pain	1	2	3	4	5
13. ( ) ( )	( )	Verbalizes history of jaw pain	1	2	3	4	5
14. ( ) ( )	( )	Verbalizes shoulder pain	1	2	3	4	5
15. ( ) ( )	( )	Verbalizes history of shoulder pain	1	2	3	4	5
16. ( ) ( )	( )	Verbalizes arm pain	1	2	3	4	5
17. ( ) ( )	( )	Verbalizes history of arm pain	1	2	3	4	5

(1=not at all important; 2=not very

			important; important; important; important	3=somewhat 4=quite 5=very				
18.	( )	( )	Verbalizes neck discomfort	1	2	3	4	5
19.	( )	( )	Verbalizes history of neck discomfort	1	2	3	4	5
20.	( )	( )	Verbalizes jaw discomfort	1	2	3	4	5
21.	( )	( )	Verbalizes history of jaw discomfort	1	2	3	4	5
22.	( )	( )	Verbalizes shoulder discomfort	1	2	3	4	5
23.	( )	( )	Verbalizes history of shoulder discomfort	1	2	3	4	5
24.	( )	( )	Verbalizes arm discomfort	1	2	3	4	5
25.	( )	( )	Verbalizes history of arm discomfort	1	2	3	4	5
26.	( )	( )	Verbalizes indigestion	1	2	3	4	5
27.	( )	( )	Verbalizes history of indigestion	1	2	3	4	5
28.	( )	( )	Verbalizes nausea	1	2	3	4	5
29.	( )	( )	Verbalizes history of nausea	1	2	3	4	5
30.	( )	( )	Verbalizes shortness of breath	1	2	3	4	5
31.	( )	( )	Verbalizes history of shortness of breath	1	2	3	4	5

Please list any additional defining characteristics important to the diagnosis not included in the above table. Use the back side of this form or attach an additional sheet if necessary.

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Objective Defining Characteristics of  
Alteration in Tissue Perfusion: Cardiac

		(1=not at all important; 2=not very important; 3=somewhat important; 4=quite important; 5=very important)						
<u>Present</u>	<u>Absent</u>	<u>Defining</u>	<u>Characteristic Degree of Importance</u>					
32.	( )	( )	Significant ECG ST segment depression (more than 1 mm below baseline) in two or more continuous leads	1	2	3	4	5
33.	( )	( )	Significant ECG ST segment elevation (more than 1 mm above baseline) in two or more continuous leads	1	2	3	4	5
34.	( )	( )	Presence of CPK <sub>MB</sub> or CPK <sub>2</sub> enzymes within the first three drawn blood samples or within the first 48 hours of admission	1	2	3	4	5
35.	( )	( )	Presence of significant Q wave on ECG (more than 1 mm deflection from baseline) in two or more continuous leads	1	2	3	4	5
36.	( )	( )	Atrial Arrhythmias	1	2	3	4	5
37.	( )	( )	Ventricular Arrhythmias	1	2	3	4	5
38.	( )	( )	Sinus Tachycardia (Heart rate $\geq$ 100 beats/minute found in two or more separate readings)	1	2	3	4	5
39.	( )	( )	Hypertension (Systolic blood pressure $\geq$ 140mmHg found in two or more separate readings)	1	2	3	4	5
40.	( )	( )	Hypertension (Diastolic blood pressure $\geq$ 90mmHg found in two or more separate readings)	1	2	3	4	5

(1=not at all important; 2=not very important; 3=somewhat important; 4=quite important; 5=very important)

41.	( )	( )	Presence of S <sub>4</sub> heart sound that resolves with the cessation of chest pain	1	2	3	4	5
42.	( )	( )	Tachypnea (Respirations of $\geq$ 26 breaths/minute found in two or more separate readings)	1	2	3	4	5
43.	( )	( )	Diaphoresis	1	2	3	4	5

Please list any additional defining characteristics important to the diagnosis not included in the above tables. Use the back side of this form or attach an additional sheet if necessary.

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## APPENDIX E

INDIVIDUAL CLINICAL DIAGNOSTIC VALIDATION SCORES AND  
INTERRATER RELIABILITY MEASUREMENTS FOR THE SUBJECTIVE  
DEFINING CHARACTERISTICS (N=20)

<u>Defining Characteristic</u>	<u>Interrater Reliability</u>	<u>Individual Item Score</u>
1. Verbalizes chest pain	0.90	0.63
2. Verbalizes history of chest pain	0.95	0.55
3. Verbalizes chest discomfort	0.95	0.78
4. Verbalizes history of chest discomfort	0.90	0.54
5. Verbalizes chest pressure	0.95	0.59
6. Verbalizes history of chest pressure	1.00	0.45
7. Verbalizes chest tightness	0.95	0.45
8. Verbalizes history chest tightness	0.95	0.40
9. Verbalizes relief of chest pain with administration of nitrates	1.00	0.78
10. Verbalizes neck pain	1.00	0.25
11. Verbalizes history of neck pain	0.95	0.17
12. Verbalizes jaw pain	0.95	0.17

table continues

<u>Defining Characteristic</u>	<u>Interrater Reliability</u>	<u>Individual CDV Score</u>
13. Verbalizes history of jaw pain	0.95	0.12
14. Verbalizes shoulder pain	0.95	0.50
15. Verbalizes history of shoulder pain	0.95	0.31
16. Verbalizes arm pain	0.85	0.62
17. Verbalizes history of arm pain	0.95	0.31
18. Verbalizes neck discomfort	0.95	0.26
19. Verbalizes history of neck discomfort	1.00	0.20
20. Verbalizes jaw discomfort	0.90	0.18
21. Verbalizes history of jaw discomfort	0.90	0.09
22. Verbalizes shoulder discomfort	1.00	0.50
23. Verbalizes history of shoulder discomfort	0.95	0.31
24. Verbalizes arm discomfort	1.00	0.70
25. Verbalizes history of arm discomfort	0.90	0.36
26. Verbalizes indigestion	0.85	0.32
27. Verbalizes history of indigestion	0.85	0.28
28. Verbalizes nausea	0.95	0.50
29. Verbalizes history of nausea	0.85	0.23

table continues

<u>Defining Characteristic</u>	<u>Interrater Reliability</u>	<u>Individual CDV Score</u>
30. Verbalizes shortness of breath	1.00	0.65
31. Verbalizes history of shortness of breath	0.95	0.45

## APPENDIX F

INDIVIDUAL CLINICAL DIAGNOSTIC VALIDATION SCORES AND  
INTERRATER RELIABILITY MEASUREMENTS FOR THE OBJECTIVE  
DEFINING CHARACTERISTICS (N=20)

<u>Defining Characteristic</u>	<u>Interrater Reliability</u>	<u>Individual Item Score</u>
32. Significant ECG ST segment depression (more than 1 mm below baseline in two or more continuous leads)	1.00	0.30
33. Significant ECG ST segment elevation (more than 1 mm above baseline in two or more continuous leads)	0.95	0.40
34. Presence of CPK <sub>MB</sub> or CPK <sub>2</sub> within the first three drawn blood samples within the first 48 hours of admission	1.00	0.84
35. Presence of significant Q waves on ECG (more than 1 mm deflection from baseline in two or more continuous leads)	0.95	0.31
36. Atrial arrhythmias	0.95	0.07
37. Ventricular arrhythmias	0.95	0.07

table continues



<u>Defining Characteristic</u>	<u>Interrater Reliability</u>	<u>Individual CDV Score</u>
38. Sinus tachycardia (Heart rate $\geq$ 100 beats per minute found in two or more separate readings)	1.00	0.10
39. Hypertension (Systolic blood pressure $\geq$ 140mmHg found in two or more separate readings)	0.85	0.49
40. Hypertension (Diastolic blood pressure $\geq$ 90mmHg found in two or more separate readings)	0.75	0.41
41. Presence of S <sub>4</sub> heart sound that resolves with cessation of chest pain	0.90	0.05
42. Tachypnea (Respirations of $\geq$ 26 breaths per minute)	0.95	0.02
43. Diaphoresis	0.95	0.55

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