IDENTIFICATION OF STRESSFUL EVENT MEDIATORS

OF PAIN IN THE CARDIAC PATIENT

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

IN THE GRADUATE SCHOOL OF THE

TEXAS WOMAN'S UNIVERSITY

COLLEGE OF NURSING

BY

ANNA PEARL FERGUSON, B.S., M.S.

DENTON, TEXAS

MAY, 1986

TEXAS WOMAN'S UNIVERSITY
DENTON, TEXAS

<u>April 2, 1986</u>
Date

To the Provost of the Graduate School:

I am submitting herewith a dissertation written by Anna Ferguson entitled
"Identification of Stressful Event Mediators of Pain in the Cardiac
Patient." I have examined the final copy of this dissertation for form
and content and recommend that it be accepted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy, with a major in Nursing.

Patricia N. Mahon, Ph.D.
Dr. Patricia N. Mahon, .Major Professor

We have read this dissertation
and recommend its acceptance:

Anne Gudmundsen
Carolyn A Tanner
Margaret T. Beard
David Marshall

Accepted

Leslie M. Thompson
Provost of the Graduate School

DEDICATED

TO

DOROTHY HUTTER

MENTOR AND FRIEND

ACKNOWLEDGEMENTS

ABSTRACT

IDENTIFICATION OF STRESSFUL EVENT MEDIATORS

OF PAIN IN THE CARDIAC PATIENT

Anna Pearl Ferguson

May 1986

The relationship between self-reported anginal pain and self-reported stressful events was investigated, using the Psychiatric Epidemiology Research Interview Scale (PERI), the Hassles and Uplifts Scales, a Frequency of Anginal Pain Checklist, and a Demographic Data Questionnaire. The subjects were men between the ages of 45 and 64 who experienced angina pectoris. Fifty-eight questionnaires were returned and analyzed.

Frequency counts of the categorical variables were calculated. Pearson correlation coefficients were used to test the null hypotheses which hypothesized no relationship existed between self-reported yearly anginal pain and self-reported desirable or undesirable major life events nor a relationship between self-reported 24-hour frequency and perceived intensity of anginal pain and stressful minor daily events.

Results of the correlations were non-significant and the hypotheses were not rejected. A correlational matrix of eight variables was constructed demonstrating a strong correlation (0.5889, p = 0.000) between undesirable major life events (PERI) and the frequency

of hassles, desirable major life events (PERI) and the frequency of hassles (0.2170, p = 0.051), PERI undesirable and hassles intensity (0.3801, p = 0.002), PERI desirable and the frequency of uplifts (0.3459, p = 0.004), and PERI undesirable and the frequency of uplifts (0.3150, p = 0.008).

Significant findings of a one-way analysis of variance were that subjects who were veterans reported more pain within a 24-hour period and a higher frequency of uplifts than non-veteran subjects; subjects with more education reported a higher incidence of pain during the previous year, and employed subjects reported greater amounts of undesirable stress.

A multiple regression analysis identified that participation in a cardiac rehabilitation program was predictive of decreased frequency of pain and that both employment and increased educational level were predictive of increased pain.

It was recommended that further studies of the relationship between life events and anginal pain be conducted utilizing a larger sample size and more precise research instruments. Studies of the roles of psychosocial stressors, defense mechanisms, and the endogenous opiate system are also recommended.

TABLE OF CONTENTS

APPENDICES (continued)

LIST OF TABLES

xi

CHAPTER I

INTRODUCTION

Pain is a major concern in the practice of nursing. It is one of
the most frequent reasons why individuals seek health care. The nurse
is in almost daily contact with someone who is experiencing pain, and a
high priority in the practice of nursing is the identification of pain-
precipitating factors and effective pain relief measures (McCaffery,
1979). Chest pain, or angina pectoris, is of particular concern
because its potential gravity and risk of sudden death create a serious
threat to biological integrity. Fear and anxiety, generated by
experiences of chest pain, pose an equally serious threat to
psychological integrity.

Faced with a threat, a person reacts with a set of
psychophysiological behaviors which are mobilized by the autonomic
nervous system and are referred to as the stress response. Both the
sympathetic and the parasympathetic systems are activated but the
sympathetic nervous system is more significant because of its vital
role in the regulation of the cardiovascular system.

Stimulation of the sympathetic nervous system results in the
release of catecholamines which increases the overall activity of the
heart by producing an increase in heart rate, an increase in atrial and
ventricular contractility and by speeding the spread of excitation
through the atrioventricular node and the ventricles. The release of

1

epinephrine causes coronary vascoconstriction resulting in increased myocardial oxygen consumption and a decrease in coronary venous oxygen saturation.

Chest pain is the protective mechanism which signals an imbalance between myocardial oxygen supply and demand. It is one of the earliest symptoms of cardiovascular disease and may persist despite optimization of medical and/or surgical treatment. This early symptom serves as both a source of stress and a result of stress to the individual with cardiovascular disease. Because of the close relationship between stress and pain, the nurse's ability to assess and manipulate stressful stimuli affecting the individual's welfare is a necessary competency for the control of pain in the cardiac patient.

Are the daily experienced stresses of living among the risk factors which are especially relevant to individuals with cardiovascular disease? Data indicate that blood pressure, heart rate and cardiac dysrrhythmias vary considerably throughout the day. In order to modify cardiovascular risk, promote improved coping behaviors and reduce episodes of angina pectoris, the relationship between daily events, the stresses experienced and cardiovascular responses should be identified, offering individuals the opportunity to anticipate the occurrence of stressful and pain-producing events and learn more effective coping skills.

PROBLEM OF THE STUDY

The following research question was formulated to be investigated by this study:

What is the relationship between self-reported anginal pain and self-reported stressful events?

JUSTIFICATION OF THE STUDY

Coronary artery disease is one of the major health problems in the United States. The National Center for Health Statistics estimates that 5,000,000 Americans have coronary artery disease, of whom nearly one-half are limited in activity because of the disease (Thom, Kannel and Feinleib, 1985). Coronary artery disease is the second most frequent cause of short-term hospitalization, and the costs of hospitalization are among the highest for any disease. In 1981, national health expenditures and lost productivity were estimated at $44 billion. Each year, 1,250,000 Americans experience a first or recurrent episode of coronary artery disease while many others suffer uncomplicated but disabling angina pectoris (Thom, Kannel and Feinleib, 1985). Coronary artery disease often develops during an individual's most productive years, and hence, the priority goal of health care is the promotion of the fullest life possible within the limits imposed by symptoms of the disease.

Epidemiological studies suggest that only a minority of patients with angina pectoris are identified due to the natural history of the

condition and the lack of consensus in diagnosis as well as denial and minimization of symptoms by many patients (Mayou, 1973; Jenkins, Stanton, Klein, Savageau and Harken, 1983). Past epidemiological studies of coronary heart disease have identified the variables of age, sex, family history, obesity, hypertension, diabetes mellitus, heavy cigarette smoking, and elevated levels of cholesterol and lipids in the blood as standard risk factors for the development cardiovascular disease. The likelihood that an individual will develop heart disease is greater as the number of risk factors increase. However, the risk factors account for only 50% of the variance in the incidence of coronary heart disease and fail to explain specific cultural and societal differences or individual vulnerability (Dorian and Taylor, 1984). There is evidence that an individual's psychological makeup does enhance the risk of heart disease and that one's mental state significantly affects physiological processes (Jenkins, 1971, 1976; Glass, 1977; Dorian and Taylor, 1984). Jenkins (1976) suggests a strong link between stressful events and angina.

Angina pectoris is one of the earliest and most persistent symptoms of cardiovascular disease. Repeated episodes of anginal pain are frightening, leading to extreme bodily discomfort, uncertain outcomes and fear of sudden death. These feelings are physiologically disruptive to the compromised myocardium, stimulating the individual's stress response, increasing the workload on the heart, and potentially provoking dangerous ventricular dysrrhythmias. Thus, anginal pain

has a triple role - that of a protector, a stressor and also the outcome product of stress.

A fundamental aspect of all stress situations is the stressful event, the stress response and its manifestations in all bodily systems (Selye, 1956). Stressful situations have profound effects on the autonomic nervous system leading to bodily changes which are non-adaptive and can produce organic changes (Jenkins, 1979). Sympathetic nervous system activity associated with the stress response evokes increased oxygen consumption, heart rate, blood pressure and respiratory rate, all of which may precipitate an oxygen supply/demand imbalance.

An event is interpreted by the individual as stressful or non-stressful in relation to a wide variety of factors. Events or situations interpreted as stressful are theorized to be characterized by the following qualities: threat of bodily or psychological harm, challenge or opportunity for gratification and potential for frustration, uncertain outcomes, necessity for vigilance until the event is ended and inappropriateness of responding by either fight or flight (Lazarus, 1975; Ostfeld, 1971). Threats which require a response not considered personally acceptable to one's ego may also be interpreted as stressful (Eliot, 1979). Lazarus (1984) introduced the concept of cognitive appraisal during which the significance of an event is evaluated based on individual patterns of beliefs, values and commitment. Stress thus viewed as a product of a complex person-

environment transaction more closely explains the variation in individual vulnerability to stress.

Much time and energy have been devoted to the quantification of social experiences. Major life events have been correlated with a variety of physiological and psychological illnesses (Holmes and Rahe, 1967; Dohrenwend, Krasnoff, Askenasy and Dohrenwend, 1978)). However, the intervening processes in the relationship have not been identified. Recently, common events of a relatively minor nature that comprise daily living activities have emerged as a promising area of inquiry in the approach to stress measurement and management (Kanner, Coyne, Schaefer and Lazarus, 1981; Delongis, Coyne, Dakof, Folkman and Lazarus, 1982; Lazarus, 1984).

THEORETICAL FRAMEWORK

The primary tenets of the stress-disease theory have grown out of the classic works of Cannon (1932) and Selye (1956). Cannon considered stress to be a disturbance of homeostasis caused by adverse physiological or environmental conditions. He introduced the concept of a stimulus which produces reactions that prepare the body for fight or flight when the individual is in a dangerous or threatening situation calling forth defensive maneuvers. When the fight or flight response occurs, the heart rate increases, the blood pressure and blood sugar levels increase, peripheral vasoconstriction occurs, and blood is distributed to the muscles.

Selye (1956) defined stress as "the sum of all non-specific effects of factors which act upon the body" (p. 42) and used the term to refer to a universal physiological response pattern following exposure to a variety of non-specific stimuli. Virtually every body organ is affected by this response pattern and the reactions are highly specific and stereotyped. Selye coined the term "stressor" to describe the factors acting upon the body and postulated that stressors could arise from the internal or external environments, be psychological or physiological in source and negative or positive in nature.

Individuals are conditioned to respond to stressors by both internal and external factors (Selye, 1956). Internal conditioning factors are an intrinsic aspect of the indiviudal. Heredity and past experiences influence the way individuals respond by leaving "tissue traces" (p. 95). External conditioning factors are those variables which act from without to influence stress reactions.

Selye (1956) believed the stress response, which he called the General Adaptation Syndrome, develops in three stages - the alarm reaction, the stage of resistance and the stage of exhaustion. The stage of alarm is characterized by the development of acute fear and anxiety with either conscious or unconscious awareness of a stressor. The body mobilizes its defenses and, if exposure to the stressor continues, the organism moves into the stage of resistance. Stress, in this stage, is evidenced primarily by an increased intensity of biological, psychological and interpersonal defensiveness during which the organism shows little overt anxiety. During this stage, adaptation

may occur and the organism will return to a state of homeostasis and well-being. The lack of adaptation ushers in the stage of exhaustion. During the course of a lifetime, an individual moves through the first two stages many times. The third stage, the stage of exhaustion, may or may not be reversible. Selye (1956) postulated a finite store of adaptation energy which is used for adaptive work. When this store is depleted, irreversible exhaustion occurs and death follows (p. 66).

Jenkins (1979) used the term "pathological end-state" to describe prolonged and relatively irreversible disorders of function which may occur at the biological, psychological, interpersonal or sociocultural level. Pathological end-states may result from damage caused by stressors against which the organism cannot defend or defends too strongly, continue too long after the stressor has ceased, or from recurrent defensive reactions inappropriate to the nature of the stressful stimulus. The latter type may support the theory of physiological response to interpersonal stressors.

The hypothalamus, a collection center for information about the well-being of the body, is triggered into action by the cerebral cortex's interpretation of a threat resulting in the occurrence of a physiological stress response (Guyton, 1981). The sympathetic nervous system is activated preparing the body for action. The catecholamines, epinephrine and norepinephrine, are secreted at the sympathetic nerve endings where the two hormones act directly on the effector organs to cause sympathetic effects. Stimulation of the adrenal medulla causes large amounts of epinephrine and norepinephrine to be released into the

circulating blood and carried to all body tissues where the effect is almost the same as direct sympathetic stimulation (Guyton, 1981).

The hypothalamus stimulates the anterior pituitary gland to release adrenocorticotropic hormone (ACTH) which controls secretions of mineralocorticoids and glucocorticoids by the adrenal cortex. Increased secretion of glucocorticoids, primarily cortisol, alters the immune response and contributes to an increased tendency for blood clotting by increasing platelet and fibrinogen production. Cortisol secretion increases greatly in stressful situations but the benefits to the organism are not known (Guyton, 1981). Mineralocorticoids increase sodium retention and potassium excretion and affect extracellular fluid volume. Stimulation of the posterior pituitary gland releases an antidiuretic hormone resulting in water retention and increased blood volume. As the alarm reaction becomes more pronounced, the continued secretion of catecholamines intensify peripheral vasoconstriction and increased cardiac output, increased metabolic rate and increased rate of oxygen consumption.

Chronic, prolonged exposure to stress ultimately results in tissue damage referred to as diseases of adaptation (Selye, 1956). The consequences of the body's own response to unusual situations or stressors are thought to play a prominent role in hypertension and diseases of the heart and blood vessels as well as many other modern health problems. Physiological changes associated with stress are especially detrimental to persons with cardiovascular disease (Grossman, 1983).

ISCHEMIC PAIN

The heart supplies blood to itself through the coronary arteries. This blood supplies oxygen and nutrients to the heart. A unique feature of coronary circulation is the high extraction of oxygen, approximately twice that of other organs. When large amounts of oxygen are required, it must be obtained through changes in coronary blood flow rather than through greater oxygen extraction (Feigl, 1983). The resting coronary blood flow in a human averages 225 milliliters per minute or 4-5% of the total cardiac output. The work output of the heart can increase as much as six- to eight-fold while the cardiac output increases only four- to five-fold to supply the extra nutrients needed (Guyton, 1981).

Coronary blood flow is regulated by two factors - the vascular response to local needs of the cardiac musculature for nutrition and stimulation of the autonomic nervous system. A direct effect of this stimulation results in the release of sympathetic transmitter substances, norepinephrine and epinephrine. These transmitter substances act on specific receptors, alpha and beta, in the blood vessel walls. Some individuals seem to have a disproportionately severe alpha receptor response, resulting in myocardial ischemia during periods of excess sympathetic drive. An indirect effect of sympathetic stimulation increases heart rate, myocardial contractility and metabolic rate (Guyton, 1981).

Under ischemic conditions, cardiac metabolism utilizes the anaerobec glycolysis mechanism for energy. Large amounts of acidic metabolic end-products such as lactic acid or tissue degenerative products such as proteolytic enzymes, histimines and kinins are released. These substances stimulate nerve endings in the cardiac muscles and pain impulses are conducted through the sympathetic afferent nerve fibers into the central nervous system resulting in angina pectoris (Guyton, 1981). Persons who have chronic angina experience chest pain under any condition that causes a discrepancy between oxygen supply and demand.

ASSUMPTIONS

1) The assessment and alleviation of pain is a primary concern of nursing.

2) The perception and experience of pain is a holistic response to stimuli.

3) Individual vulnerability to stress is a function of perception and reaction to the subjective environment.

HYPOTHESES

The hypotheses to be investigated were stated as null hypotheses in accordance with statistical theory. This permits the results of the statistical tests to be stated in terms of the probability that the null hypotheses are false (Huck, Cormier and Bounds, 1974).

The hypotheses to be investigated were:

1)   There is no statistically significant relationship between self-reported yearly anginal pain experiences and self-reported desirable major stressful life events as measured by the Psychiatric Epidemiology Research Interview Life Events Scale.

2)   There is no statistically significant relationship between self-reported yearly pain experiences and self-reported undesirable major stressful life events as measured by the Psychiatric Epidemiology Research Interview Life Events Scale.

3)   There is no statistically significant relationship between self-reported 24-hour frequency of anginal pain and the perceived intensity of stressful minor daily events as measured by the

    a. Hassles Scale

    b. Uplifts Scale

4)   There is no statistically significant relationship between self-reported 24-hour frequency of anginal pain and the self-reported frequency of stressful minor daily events as measured by:

    a. Hassles Scale

    b. Uplifts Scale

DEFINITION OF TERMS

Chest pain - transient, recurring episodes of sub-sternal or precordial pain associated with known cardiovascular disease.

Minor daily events - those experiences occurring in the course of day-to-day living which are perceived as affecting the individual's well-being.

Major life events - happenings which crucially affect the individual and are treated as universally stressful.

Desirable life event - those experiences perceived as favorable or desirable by the individual.

Undesirable life event - those events perceived as negative or threatening to the individual.

LIMITATIONS

1) The subjects are a non-random sample who may be more or less representative of those in the target population.

2) The sample size is small and limited to one geographic area.

3) Limitations of the measuring instruments may include lack of objectivity based on self-report.

SUMMARY

Chest pain is a protective feature, signaling a discrepancy between myocardial oxygen supply and demand. The potentially life-threatening relationship between stress, increased myocardial workload, and chest pain requires exploration. It is generally accepted that major life events serve as stressors to the human organism. The relationship between the stressors experienced by daily living activities may also have an effect on anginal pain.

CHAPTER II

REVIEW OF LITERATURE

In order to better understand and investigate the relationship between the transactions of living and the experience of chest pain in the cardiac patient, a thorough review of literature was conducted. The following areas were reviewed: a) gate control theory of pain, b) endogenous opiate system, c) pathophysiology of oxygen requirements, d) neural control of coronary blood flow, e) physiological stress response, f) psychological stress response, g) life change and illness, h) major life events, i) minor life events, j) nursing studies of stress and pain, k) stress and cardiovascular abnormalities, and l) Type A behavior patterns.

GATE CONTROL THEORY OF PAIN

The gate control theory of pain (Melzack and Wall, 1965; Wall, 1976) exists as one of the more useful theories of pain. This theory provides an integrated model for appreciating the many factors that contribute to individual differences in the pain experience and a conceptualization of categories of activity that may form a theoretical basis for developing various pain relief measures (McCaffery, 1979). The gate control theory attempts to integrate the facts from the three competing theories (specificity, pattern or summation and affect

theories) and to provide an explanation for both the physiological and psychological aspects of the pain experience.

According to the gate control theory, pain is a perceptual behavioral state of the whole organism, triggered by signals announcing the presence of injury (Wall, 1976). The theory proposes a mechanism by which these signals are transmitted and modulated by the effects of other afferent impulses and descending controls from the cortex and brainstem.

Nociceptive information is transmitted to the spinal cord by way of small diameter delta A fibers and large diameter C fibers. These fibers terminate within the substantia gelatinosa in the dorsal horns of the spinal cord. The substantia gelatinosa is composed of highly specialized cells which receive afferent input from large and small fibers and influence the activity of the cells that project to the brain. Transmission of impulses in the dorsal horns is controlled by a gating mechanism which is controlled by rival effects of large versus small afferent fibers (Melzack and Wall, 1965).

Central transmission cells receive convergence of excitatory and inhibitory influences from other afferent fibers so that cell transmission is controlled by the state of activity of other afferents as well as the presence or absence of injury (Wall, 1976). The level of perceived pain is decreased when input is conveyed to the interneurons and transmission cells by rapidly conducting large diameter fibers. These impulses act directly in the presynaptic axon terminals to block impulses in the terminals or to decrease the amount of transmitter substance released. They may act post-synaptically on

spinal transmission cells by decreasing their level of excitability. Small diameter fiber groups inhibit the substantia gelatinosa inhibitory interneurons, opening the synaptic gate to impulses from peripheral fibers thus increasing the excitatory input to transmission cells and increasing the perceived level of pain.

Descending controls from the brain also influence the excitability of transmission cells (Wall, 1976). Attention, emotion and memories exert control over sensory input via this central control trigger. The gate control theory explains how the intensity of painful stimuli can be decreased at the perceptual level through a gate control effect at the spinal segmental level or through a central control trigger at the cortical and brainstem levels.

During the anticipation of pain, relief for the impending pain may be enhanced if the patient experiences a moderate amount of anxiety and this anxiety is channeled into methods of coping with the pain. The anxiety that is most often the obvious emotion associated with acute pain eventually becomes less prominent and is replaced by reactive depression.

The behavior of persons who complain of pain is variable because of individual perceptions of self and environment and enduring mood states (Melzack and Chapman, 1973). Attention is basic to perception, the way one experiences the world of objects, people and events. By attending to something, one focuses perceptual processes on it to the exclusion of other things. Attentional processes may either increase or decrease the perception of pain.

Enduring mood states may generate pain behavior and it is postulated that pain may appear as a symptom of depression. Misplaced responses to emotional arousal may occur without a clearly identified threat. Subjective feelings of fear coupled with increased autonomic nervous system response may cause an individual to attribute discomfort to a concomittant pain state and turn attention to painful bodily sensations. Thus, interpersonal conflict, threats of failure and environmental stressors may contribute to the pain complaint (Melzack and Chapman, 1973).

The pain experience is described as having both a sensory and a reactive component. The reactive component is more psychological in nature and is believed to be affected by cognitive processes. Casey and Melzack (1967) suggested that the intensity of the sensory component need not have a one-to-one relationship with the emotional reactive component.

Johnson (1972) and Johnson and Rice (1974) studied independent evaluation of the sensory and reactive components of ischemic pain induced by a tourniquet technique in which a standard adult-sized blood pressure cuff was applied to the upper arm and inflated to 250 mm Hg. Their results demonstrated congruence between expected and experienced sensations and a reduced level of distress when subjects were given accurate sensory information.

ENDOGENOUS OPIATE SYSTEM

The discovery of the endogenous opiate system in the mid-1970's (Hughes, 1975; Goldstein, 1976) created a new avenue for pain research.

The enkephalins, consisting of the pentapeptides, methionine-enkephalin and leucine-enkephalin, and three polypeptides, alpha-, beta-, and gamma-endorphin, are opioid-like substances widely distributed in the body and thought to combine with specific receptors to produce analgesia similar to that of morphine. Recently, another class of endogenous opiates, the dynorphins, an extended form of leucine-enkephalin, has been described. The dynorphins are one of the most potent opioid peptides known (Grossman and Sutton, 1985). Certain forms of stress may act as natural inputs to the endogenous opiate system (Lewis, Cannon, and Liebeskind, 1980). Opiate receptors are closely associated with the known pain pathways and the spinal cord (Goldstein, 1978).

The endogenous opiates have chemical similarities but exist separately and are thought to have different functional roles. Beta-endorphin is the most widely studied endorphin and is found in large concentrations in the anterior and intermediate lobes of the pituitary gland (Goldstein, 1976). Adrenocorticotropic hormone (ACTH) and beta-endorphin are secreted simultaneously by the pituitary gland in response to acute stress but the peripheral target for beta-endorphin has not been identified (Guillemin, Vargo, Rossier, Minick, Ling, Rivier, Vale and Bloom, 1977). Enkephalins are widely distributed in the central nervous system with high concentrations in the limbic system and the dorsal horn of the spinal cord.

Early studies of endogenous opiates focused on the effects of narcotic antagonists on clinical and experimental pain states, stimulation-produced analgesia and measurement of endogenous opioid

levels (Huhman, 1982). A naloxone injection was associated with a significant increase in pain intensity in individuals following tooth extraction (Levine, Gordon, Jones, 1978). However, Lindblom and Tegner (1979) discovered that naloxone did not alter levels of pain in ten chronic pain patients, and Grevert and Goldstein (1978) found that paid healthy volunteers in an experimental pain situation reported no change in the pain threshold after naloxone administration. They hypothesized that endogenous opiates are not activated in low stress situations. Current studies remain paradoxical.

O'Brien, Rutan, Sanborn and Omer (1984), in a study of forty-two healthy subjects divided into three groups and treated with transcutaneous electrical nerve stimulation, found no significant difference in blood beta-endorphin levels. They further found that blind administration of naloxone did not significantly alter the subjects' perception of pain. However, Hughes, Lichstein, Whitlock and Harker (1984) demonstrated that 67% of healthy subjects exhibited an increased plasma beta-endorphin level and an increase in the pain threshold after thirty minutes of transcutaneous electrical stimulation.

Although a relationship between the endogenous opiate system and exercise metabolism has not been identified due to lack of knowledge about the physiological functions of the endogenous opiate system, it has been established that plasma levels of beta-endorphin increase with exercise (Farrell, 1985). Several studies have related endogenous opiates to various aspects of physical activity in animals (Amir, 1982; Shyo, Andersson and Theoren, 1982).

A relationship between the mechanisms hypothesized in the gate control theory and endogenous opiates may exist (Frederickson, Burgis, Harrel and Edwards, 1978). Substance P, a possible neurotransmitter first suggested in 1936 (Dolphin, 1983), is thought to act as a sensory transmitter of the primary afferent small-diameter fibers in the dorsal horn of the spinal cord. Substance P has dual effects on pain perception and may interact with the enkephalins in controlling nociceptive processes. It is possible that substance P and the enkephalins have opposing neurotransmitter or neuromodulator roles regulating the through-put of nociceptive information in specific regions of the brain and spinal cord. Immunohistochemical studies show that substance P and the enkephalins share certain sites of high density localization, i.e. hypothalamus, substantia nigra, periaquoductal central gray and substantia gelatinosa (Frederickson, Burgis, Harrel and Edwards, 1978). Morphine, beta-endorphin and enkephalin have been found to inhibit the release of substance P (Jessel and Iverson, 1977).

PATHOPHYSIOLOGY OF MYOCARDIAL OXYGEN REQUIREMENTS

The heart is considered an obligatory aerobic organ because any oxygen deficit immediately results in impaired ventricular function and electrical instability (Kloster and Bristow, 1985). The myocardium is highly dependent on oxygen for the conversion of chemical energy to mechanical work and for normal electrical function (Weber and Janicki, 1979). When a state of myocardial ischemia exists, a local state of tissue hypoxia results, disrupting the distribution of intracellular

potassium and magnesium and extracellular sodium, markedly affecting cardiac rhythmicity and contractility. Increased production of adreno-sympathetic catecholamines is thought to be an important cause of myocardial hypoxia (Krantz and Manuck, 1984).

The ischemic myocardium may respond to emotional stress with such cardiovascular manifestations as augmentation of heart rate with shortening of isometric tension time of the left ventricle. The impaired myocardial oxygen supply may result in rhythm disturbances such as extrasystoles, atrial fibrillation, atrio-ventricular blocks and ventricular tachycardia and fibrillation (Raab, 1971).

Normally, myocardial extraction of oxygen from arterial blood supplied by the coronary arteries is nearly maximal. Therefore, the only significant way to meet increased myocardial oxygen requirements is through increased coronary blood flow. The determinants of myocardial oxygen consumption are the left ventricular wall force developed and sustained during systole, the rate of force development and the heart rate.

A decrease in coronary vascular resistance is the major compensatory response to increased myocardial oxygen needs (Kloster and Bristow, 1985) and is modulated by the interaction of mechanical, hydraulic, metabolic and neurohumoral factors. The basal metabolic rate of the cardiac muscle fibers also influences myocardial oxygen needs (Guyton, 1981).

Coronary artery obstruction due to atherosclerosis is the most common factor influencing coronary artery blood flow. This fixed arterial obstruction prevents an increase in coronary blood flow in

response to increased myocardial needs resulting in an intermittant disproportion between myocardial oxygen supply and demand (Kloster and Bristow, 1985). When the oxygen supply fails to increase appropriately, severe ischemic pain and loss of muscle strength occurs.

The classic description of anginal (ischemic) pain is of an oppression or tightness in the chest or a burning, gripping, stabbing, crushing or squeezing sensation or as an inability to breathe. The pain is usually substernal, precordial or diffuse across the chest. The pain may radiate to the shoulder, along the medial aspect of the upper extremity or along the ulnar nerve to the hand where it is experienced as a vague ache, numbness or tingling. Anginal pain may radiate to the neck, jaw, teeth, scapular area or epigastrium (Clark, 1975).

NEURAL CONTROL OF CORONARY BLOOD FLOW

Neural regulation of coronary blood flow results from stimulation of the autonomic nervous system. Direct effects result from the actions of neurotransmitter substances, acetylcholine and norepinephrine, on the coronary vessels themselves. Indirect effects result from changes caused by increased or decreased activity of the heart (Guyton, 1981).

There is extensive sympathetic innervation of the coronary vessels. Sympathetic stimulation produces an increase in heart rate, heart contractility and metabolic rate. This increased activity then activates a local blood flow regulatory mechanism for dilating the

coronary arteries and increasing the blood flow in proportion to the metabolic needs of the myocardium.

Alpha (constrictor) receptors and beta (dilator) receptors, sensitive to the effects of norepinephrine and epinephrine, exist in the coronary arteries. Sympathetic stimulation may cause either coronary vasoconstriction or dilatation depending on the presence or absence of the receptor sites. Some persons seem to have a disproportionately severe alpha vasoconstrictor effect resulting in myocardial ischemia during periods of intense sympathetic stimulation (Guyton, 1981).

PHYSIOLOGIC STRESS RESPONSE

Early stress research focused on the physiological manifestations of the stress response while minimizing the etiological significance of psychological stress factors in increasing susceptibility to illness. Anticipation of threat or harm leads to the production of the physiological stress response (Monat and Lazarus, 1977).

The physiologic stress response is a uniform pattern of biochemical, functional and structural changes involved in coping with stressor activity (Selye, 1976). Selye thought that the pleasant or unpleasant aspects of stressors were incidental and considered the intensity of the demand for adaptation or readjustment to be the most important determinant of the stress response. Selye (1956) differentiated the symptoms of specific diseases from the "syndrome of just being sick" (p. 16) and noted that exposure to diverse noxious stimuli produced a stereotyped response consisting of adrenocortical

hypertrophy, atrophy of lymphatic structures and erosion of gastric mucosa.

The physiological stress response is mediated through the hypothalamic-pituitary-adrenal axis and the sympathetic nervous system. When these mechanisms are activated, the body prepares for action. Depending upon the mediating or conditioning factors which can selectively influence the reactivity of certain organs, the same stressors can elicit different manifestations in different individuals (Selye, 1975). Diseases of adaptation represent insufficient, excessive or faulty reactions to stressors and depend upon the simultaneous effects of several potentially pathogenic factors which, alone, would not produce disease (Selye, 1976).

With activation of the hypothalamus, corticotropin releasing factor (CRF) is conducted to the anterior pituitary gland by the hypothalamic-hypophyseal portal vessels stimulating production and release of adrenocorticotropic hormone (ACTH). ACTH stimulates the release of the adrenal cortical hormones. Mineralocorticoids affect electrolyte concentrations in extracellular fluids. Glucocorticoids stimulate gluconeogenesis, regulation of protein metabolism, mobilization of fatty acids and antiinflammatory effects (Guyton, 1981).

Stimulation of the posterior pituitary results in secretion of the anti-diuretic hormone (ADH) with several effects relevant to the cardiovascular system. ADH is a potent controller of sodium ion concentration and extracellular fluid volume. ADH also has a potent

pressor effect, constricting the arterioles and increasing the arterial pressure (Guyton, 1981).

The autonomic nervous system, also activated by the hypothalamus, transmits impulses to the body through the sympathetic and parasympathetic systems. Preganglionic sympathetic nerve fibers end directly on special cells in the adrenal medulla which secrete epinephrine and norepinephrine. Body organs are stimulated by direct sympathetic stimulation and by catecholamines circulating in the blood (Guyton, 1981).

PSYCHOLOGIC STRESS RESPONSE

Physiological stress theory and psychological stress theory are complementary. Psychological stress theory outlines the conditions under which stress is evoked and physiological stress theory describes its form (Mikhail, 1981).

The influence of psychologic factors on stress-related hormonal patterns as well as psychologic responses to stress have been documented. Lazarus defined stress as "any event in which environmental demands, internal demands or both, tax or exceed the adaptive resources of an individual" (Monat and Lazarus, 1977, p. 3). He further stated that "It has become increasingly apparent that stress is important as a factor in illness in general and in chronic illness in particular. Many present day illnesses cannot be explained in terms of a single 'cause'. Research suggests that a significant portion of the population seeking medical care is suffering from stress-based illness" (Lazarus, 1977). Lazarus (1980) suggested that hormonal

changes produced by physiologically noxious agents might be due to their psychological impact. Responses to psychological stress are physiological reactions, alterations of adaptive functioning, motor-behavioral reactions and negatively-toned affect (Monat and Lazarus, 1977). Conflict is a major source of psychological stress. The anticipation of threat or injury can lead to important changes in an individual's thoughts, feelings, and autonomic and endocrinological processes.

Monat and Lazarus (1977) identified three main ways in which stress could lead to somatic illness: by disruption of tissue function through neurohumoral influences; by engaging in coping activities that are damaging to health; and psychological and/or sociological factors which lead the person to minimize the significance of various symptoms. Orth-Gomer and Ahlebom (1980) found the risk of developing ischemic heart disease six times greater with the experience of psychological stress than without. The relative risk was not reduced when controlling for traditional risk factors. It was assumed that the experience of stress in the 5-year period prior to disease onset acted as a precipitating factor in cooperation with long-term predisposing risk factors.

Serum cholesterol may serve as an important mediator between psychological variables and coronary heart disease (van Doornen and Orlebeke, 1982). Numerous studies have demonstrated a rise in serum cholesterol levels associated with increased stress (Theorell and Akerstedt, 1976; Taggart and Carruthers, 1971; Dreyfuss and Czaczkes, 1959; van Doornen and Orkebeke, 1982). An increase in cholesterol

levels during stress is one result of the sympathetic reaction to threatening stimuli. Free fatty acids are mobilized from adipose tissue largely mediated by the release of norepinephrine from sympathetic nerve endings and by circulating catecholamines (van Doornen and Orlebeke, 1982). A positive correlation between depression and serum cholesterol levels has also been demonstrated (Rahe, Rubin, Gunderson and Arthur, 1971).

LIFE CHANGE AND ILLNESS

Little is known, despite years of research, about conditions under which stress has a greater or lesser impact or why it may manifest itself in illness (Mechanic, 1976). The frequent association of illness onset and high levels of stress has seemed to confirm the etiological importance of critical life changes (Rabkin and Struening, 1976; Holmes and Rahe, 1967; Paykel, Prusoff and Uhlenhuth 1971; Rahe, 1969).

Relating the occurrence of life events to the development of illness can be traced to Adolph Meyer (1951) who, in the 1930's, plotted life charts of his patients from which he explored the temporal sequence of critical events and illness onset. Wolff (1947) followed this line of research and concluded that people under constant stress had a high incidence of psychosomatic disease. Sustained bodily alterations resulting from psychological stress may produce severe, long-lasting disorders of function and the inappropriate or prolonged use of protective patterns may result in the occurrence of irreversible tissue changes.

Various models and subclassifications of life events have been proposed in an effort to specify qualitative variations among events. Ruch (1977) reported a multidimensional model of life events with three event dimensions: degree of life change, desirability of life change, and the area of life change.

Jenkins (1979) postulated a multilevel model for studying the interaction of stress and the human organism. Five classes of variables: adaptive capacity (host resistance), stimulus input or stressor, alarm reaction, defensive reaction, and pathological end-state (exhaustion), were taken into account as well as the adaptive capacity of the organism before the stressor occurred and the defenses mobilized in response to the stressor. Jenkins' model distinguishes among the responses of alarm, defensive reaction or resistance and pathological end-state, a relatively irreversible condition remaining after resistance has ended.

Jenkins' model, applied to a study of life stress, social coping resources, impulse control and psychological problems in Air Traffic Controllers, demonstrated the importance of distinguishing the state of an organism's reaction to stress, the adaptive strengths with which a person enters stressful situations, the vigor and appropriateness of defenses and the amount of stressful input encountered. Awareness of the many different conceptual levels on which the interaction of stress and the organism takes place is taken into account (Jenkins, 1979).

MAJOR LIFE CHANGES

Holmes and Rahe (1967) hypothesized that illnesses of all kinds increase following periods of major life change. Both positive and

negative changes are considered to be stressful. Holmes and Rahe (1967) developed a questionnaire, the Schedule of Recent Experiences, which documents significant changes occurring in an individual's life in the areas of personal, family, community, social, religious, economic, occupational, residential and health experiences occurring within the past several months or years. A life change unit score is assigned to each change according to the importance of the change and a total life change unit score is computed. The higher the total life change units score, the higher the likelihood of illness. Each life change event is weighted according to the intensity of change so the total life change unit score is a measure of intensity of change rather than the number of recent life changes.

Rahe and Arthur (1968) compared the relationship of life changes occurring before, during and after episodes of illness in an attempt to clarify the question of life change as a result, rather than a cause of illness. Their findings supported prior studies that life stress prior to illness onset increased in a curvilinear fashion with the majority of stresses found in close temporal proximity to the illness. A new finding was that life changes resulting from illness experiences were virtually equal in timing and intensity to the life experiences having a causal influence on the illness.

Appley and Trumbull (1967) define stress as a response state rather than an environmental event and argued that an individual's prior history and motivational structure must be considered in predicting stressful events. They postulated a stimulus-organism interaction to explain why some individuals respond to certain stimuli

with a stress response and others do not. No stimulus, with the exception of life-threatening situations, is a stressor to all individuals.

Redfield and Stone (1979) questioned the generalizability of Holmes and Rahe's Social Readjustment Rating Scale (1967) and suggested three domains of variables important to understanding the nature of life stress. They proposed that individuals, life events, and qualitative dimensions on which events vary are related by complex interactional processes and that individuals and groups differ between groups and within homogeneous samples. They demonstrated that events were differentially desirable, meaningful and change-producing on the basis of sex and life cycle differences as well as the personal significance of the event. Lazarus and Launier (1978) supported the proposition that stimulus variables and characteristics of individuals interact to determine reactions to stressful events.

Dohrenwend and Dohrenwend (1974) focused on the nature of a stressful life event or combination of events and the impact of this experience on the individual's subsequent well-being. The Psychiatric Epidemiology Research Interview Life Events Scale (Dohrenwend, Krasnoff, Askenasy and Dohrenwend, 1978) was developed to assess stressful life events. Mulvey and Dohrenwend (1983) used a stressful life events paradigm to explore and compare the life experiences of men and women. They found that the occurrence of stressful life events varies with gender, age and marital status.

Duckitt and Broll (1983) found that undesirable life changes were significant in predicting illness behavior while total life change did

not. They found a significant interaction between the dimension of sensitivity and life stress. Persons with low scores on this dimension showed a strong tendency to react to stress with increased illness behavior. Kobasa and Puccetti (1983) identified the personality characteristic of hardiness and demonstrated that hardiness had a significant impact on illness behavior. Stressful life events tended to have less effect on illness behavior in the hardy individual.

MINOR LIFE EVENTS

The study of relatively minor life events has recently provided an alternative methodology for the study of relationships between stress and illness. Minor but continuous day-to-day events may be important to health outcomes. There are a number of possible relationships between a pattern of irritating, frustrating occurrences and an individual's physical and mental health. The importance of positive experiences occurring concurrently with negative experiences may have a role in preventing or attenuating stress.

A twelve-month study of stress, coping and emotions demonstrated a positive correlation between negative events or hassles and positive events or uplifts (Kanner, Coyne, Schaefer and Lazarus, 1981). These researchers were able to isolate patterns of hassles and uplifts for different groups allowing themes to emerge which were unique to each group and consistent with the subjects' ages and occupations. In a comparison of the respective ability of hassles, uplifts and major life changes to predict psychological symptoms, hassles were found to be a

more powerful predictor of psychological symptoms than major life changes or uplifts.

Building upon the Kanner et al. methodological and conceptual foundation for studying minor life events and their association with psychological symptoms, Monroe (1983) found that undesirable minor events significantly predicted psychological symptoms even after initial symptom status was controlled for statistically. Seventy-three volunteers were administered the Psychiatric Epidemiology Research Interview (PERI) Life Events Scale (Dohrenwend, et al, 1978) to assess major life events, the General Health Questionnaire (Goldberg, 1972) to assess psychological symptoms and a self-report measure derived from Epstein (1979) to measure pleasant (uplifts) and unpleasant (hassles) events. Findings indicated that relatively minor unpleasant life events are significant and independent predictors of subsequent psychological symptoms. Pleasant event frequency scores showed no significant association with psychological symptoms. There were statistically significant associations between unpleasant minor events and major undesirable life events but no significant correlations between pleasant event frequency scores and major event categories (Monroe, 1983).

Similar findings were reported in a study of somatic health, hassles, uplifts and major life events (Delongis, Coyne, Dakof, Folkman and Lazarus, 1982). This study demonstrated a positive correlation between somatic illness and the frequency and intensity of hassles. Significant correlations between major life events and health were for

events occurring 10 to 36 months prior to the assessment of health. No relationship between somatic health and uplifts was identified.

RELATIONSHIP BETWEEN STRESS AND CARDIOVASCULAR ABNORMALITIES

Angina pectoris is usually associated with ischemia of the myocardium (Epstein, 1971) and may be precipitated by either physical exertion or emotional stress. The mechanisms by which emotional stress induce angina pectoris are not well understood but empirically, there appears to be a link between stressful life events and cardiovascular abnormalities. Studies have focused on identifying the mechanisms whereby stressful events and untoward cardiac events are related. Dimsdale and Moss (1980) discussed the relationship of emotional stress to autonomic cardiovascular responses. Sigler (1967) demonstrated that recall of emotionally upsetting situations produced transient electrocardiograph changes in patients with heart disease.

Bradford (1981) identified a negative correlation between marital adjustment and chest pain and between trait anxiety and marital adjustment in the individual with cardiovascular disease. Haughey, Brasure, Maloney and Graham (1984) studied the relationship between stressful life events, measured in life change units, and electrocardiogram abnormalities. Although they found no significant correlation between subjects' life change unit scores and abnormal electrocardiogram episodes, they did identify increased episodes of sinus tachycardia when the total number of emotions increased. Another significant finding was that the number of electrocardiogram

abnormalities decreased as the number of subjects' social interactions increased.

A study of 204 men awaiting coronary by-pass surgery identified biomedical, behavioral and psychological correlates of angina pectoris. Forty-four percent of the group reported emotionally provoked angina during the reference month of study. From a pool of forty-four independent variables associated with angina, sixteen were found to be significantly associated with emotional angina. Persons who reported a few severely upsetting life crises were more prone to emotional angina than persons with many minor crises. Other significant variables associated with angina were various sleep disturbances, frank dissatisfaction with many aspects of life, anger and hostility (Jenkins, Stanton, Klein, Savageau and Harken, 1983).

One study using the General Health Questionnaire developed by Goldberg (1972), an instrument to measure stress-related psychological symptoms in a group of ischemic heart disease patients, revealed a curvilinear relationship between low and high scorers and rehospitalization/death rates (Prince, Freasure-Smith and Rolicz-Woloszyk, 1982). The researchers postulated that the mechanism of denial in low scorers and willingness to assume the sick role (compliance) in high scorers provided protection against ischemic heart disease. They further theorized that denial may be a psychological component of the endorphin response providing endogenous narcotization during life threatening situations in which pain and anxiety are maladaptive.

NURSING STUDIES OF STRESS AND PAIN

Stress has been implicated in the etiology of many disorders, and over the past decade the nursing profession has begun to examine the role of stress and variability of coping relates to illness. The types and severity of stressors and coping methods of patients on hemodialysis were measured and the results indicated that psychosocial stressors have an impact on the indiviudal equal to that of physiological stressors (Baldree, Murphy and Powers, 1982). Hemodialysis patients in this study reported greater use of problem-oriented coping behaviors than affective-oriented methods.

Jalowiec and Powers (1980) examined life stress and coping behavior in individuals seeking care for non-serious acute illness at an emergency room and in newly diagnosed hypertensive patients. The emergency room patients reported significantly more stressful life events in the year preceding illness onset than did the hypertensive patients. The E.R. patients reported more events in the personal and social categories while hypertensives reported more in the health category. Both groups reported the use of problem-oriented coping behaviors, a method considered essential for successful adaptation (Lazarus and Launier, 1978).

Randolph (1984) studied 60 female college students exposed to a stressful stimulus and treated by therapeutic or physical touch. The groups were compared on levels of physiologic response through electromyographic, skin conductance and peripheral skin temperature measures. This study failed to confirm the hypothesis that the therapeutic touch group would remain more relaxed. It was suggested

that subjects' focus of attention was on the stress producing stimulus and expectation of a negative experience rather than the coping strategy.

DeVillier (1984) discussed the relationship of stress to cellular healing. Elevated levels of cortisol, resulting from the physiological response to stress, inhibits the wound healing process through a number of direct effects at the cellular level. A study of psychological stress in the spouses of patients with a newly diagnosed myocardial infarction demonstrated that the most common threat was one of loss and the dominant affects were anxiety and fear (Bedsworth and Molen, 1982).

In a study of the relationship between stress and learning in the adaptation process following myocardial infarction, Guzzetta (1979) found that subjects experienced higher psychological anxiety just after transfer from the coronary care unit and just prior to discharge home. She identified an inverse relationship between the level of psychological anxiety and the level of learning. The level of physiological anxiety as measured by urinary cortisol levels was not correlated with the level of learning.

The effects of nursing interaction on patients in pain using interaction analysis categories to define nursing approaches demonstrated that approaching the patient as a "whole person" was more likely to produce pain relief (Diers, Schmidt, McBride and Davis, 1972). These findings were supported in a study of the influence of nursing interventions on chest pain (Bourbonnais and Mackay, 1981). Danner (1981) concluded that the use of hypnosis, transcutaneous electrical stimulation or a combination of the two treatment modalities

were effective alternatives to narcotic analgesics in reducing chronic pain.

TYPE A BEHAVIOR PATTERN

The Type A behavior pattern has received the most attention of all the possible psychosocial causes of coronary heart disease. Type A behavior is not a stressor nor an emotional reaction. Rather, it is a pattern of behavior characterized by chronic, hard-driving, competitive, impatient and aggressive responses to challenges in the environment (Friedman and Rosenman, 1974). These behaviors are relatively absent in the Type B behavior pattern. The Type A behavior pattern is considered a risk factor associated with increased risk of coronary heart disease and of the same order of magnitude as other risk factors (Cooper, 1981).

The Type A behavior pattern is not inherited but considered to be a result of the interactions between susceptible individuals and particular environmental precipitants which emphasize performance, control, mastery and aggressive, competitive, rapid achievement. Based on this hypothesis, altering individual susceptibility or environmental factors would decrease associated cardiovascular risks (Dorian and Taylor, 1984).

Although there is considerable evidence supporting a relationship between Type A behavior patterns and coronary heart disease, the literature is inconsistent regarding the association between job factors and coronary heart disease. Matteson and Ivancevich (1982) studied the match between individuals and organizational behavior

patterns as related to various health indices. They found that individual characteristics of the Type A person were exacerbated in an organization characterized by time pressure, work overload, role conflict and ambiguity. Type B persons in Type B organizations reported fewer health complaints, stress and absenteeism.

Chesney et al. (1981) found only the job environment variable of physical discomfort to be directly related to coronary heart disease risk factors. They were unable to demonstrate a direct relationship between Type A subjects and coronary heart disease. Type A subjects who rated the environment as encouraging autonomy, independence, increased repsonsibility and increased peer cohesion were found to have lower blood pressure. Type B subjects had higher blood pressure under those conditions and lower blood pressure in environments that encouraged dependence and established routines.

A study of Type A behavior and the long-term outcome of acute myocardial infarction revealed no relationship between the two variables, and it was suggested that more specific personality characteristics than Type A behavior be examined (Case, Heller, Case, Moss and the Multicenter Post-Infarction Group, 1985). Self involvement has been related to the extent of coronary disease in the absence of a relationship with Type A behavior (Scherwitz, McKelvain & Laman, 1983).

SUMMARY

The literature relevant to pain and stress measurement and management has been reviewed. There is, as yet, no comprehensive theory

of pain or stress and treatment of anginal pain is viewed as being amenable primarily to pharmacological or surgical intervention. It is believed that identification of stressful event mediators of pain in the cardiac patient would provide a basis for nursing intervention and improved coping skills for the individual with cardiovascular disease.

CHAPTER III

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

This study utilized an exploratory research design to examine the relationship between self-reported anginal pain and self-reported stressful events. The aim of the exploratory method is to describe the phenomena and to discover relationships. Descriptive studies are essential as a foundation for theory development. Exploratory research extends descriptive studies toward the discovery of important relationships among the variables of interest (Polit & Hungler, 1983).

The level of inquiry for this type of descriptive study is Level II, described as factor-relating theory (Diers, 1979). The purpose of factor-relating studies is to describe relationships rather than to generalize to other populations.

SETTING

Potential subjects were identified through the cardiology outpatient clinic of a Veterans Administration Medical Center and the cardiac rehabilitation program of a large private hospital. Those persons meeting the criteria for the study were contacted and invited to participate. Questionnaires were distributed in the clinics and by mail. A mailed questionnaire is an appropriate means of collecting data about psychological variables especially if the subjects are literate and dispersed over a large geographic area (Marriner, 1981).

40

Data were recorded by subjects in the clinic setting or in their own homes.

POPULATION AND SAMPLE

The research population was a group of men who have cardiovascular disease and experience angina pectoris. The study used a non-random sample, meeting the following criteria:

1) between the ages of 45-64

2) write and understand the English language

3) willingness to participate in the study

The sample was obtained by contacting patients from a cardiology outpatient clinic of a Veterans Administration Medical Center and a cardiac rehabilitation program of a large private hospital in central Oklahoma. Those patients meeting the criteria for the study were contacted and invited to participate. They received a letter (Appendix B) which explained the purpose of the study and gave the name of the contact persons if there were questions. A total of 192 subjects were contacted. Sixty subjects completed and returned the Demographic Date Sheet, the Psychiatric Epidemiology Research Interview Life Events Scale, the Hassles and Uplifts Scales, and the Frequency of Anginal Pain Checklist. Two sets of data had to be discarded due to incomplete responses. Fifty-eight sets of data were analyzed.

PROTECTION OF HUMAN SUBJECTS

In compliance with the rules and regulations of Texas Woman's University's Human Subjects Review Committee, the following actions to

insure the protection of the study subjects were taken. Prior to initiation of the study, written approval to conduct the study was obtained from the Human Subjects Review Committee and the Graduate School of Texas Woman's University (Appendix A), the Health Sciences Center at the University of Oklahoma (Appendix A), and the participating clinics in which data were collected (Appendix A). A complete written explanation of the purposes and nature of the study and the directions and time required for completing the questionnaires was furnished to all subjects (Appendix B). Return of the questionnaires constituted consent of the subjects.

All actual or potential risks were made known to the subjects. There were no physical risks. Possible psychological discomfort may have been due to the personal and emotion-provoking nature of the instruments. All subjects were advised of their right to withdraw from the study at any time. Data were handled in a confidential manner. Data were coded to insure anonymity and were destroyed on completion of the study.

INSTRUMENTS

The relationship between the experience of chest pain, minor events of daily life and major life events was investigated. This investigation utilized the Berkeley Hassles and Uplifts Scales (Appendix C), the Psychiatric Epidemiology Research Interview Life Events Scale (Appendix C), and a Pain Frequency Check List (Appendix C). Permission to use the Hassles and Uplifts Scales was obtained from

R.S. Lazarus, Ph.D. (Appendix C). Permission was obtained from Bruce Dohrenwend, Ph.D. to use the PERI Scale (Appendix C).

The Hassles Scale

The Hassles Scale, developed by a group working on the Berkeley Stress and Coping Project at the University of California at Berkeley, is a 117 item questionnaire which describes irritants of daily living ranging from minor annoyances to major difficulties (Kanner, Coyne, Schaefer and Lazarus, 1981). The areas of work, health, family, friends, the environment, practical considerations, and chance occurrences were used as guidelines to generate the test items. Study participants rate the perceived severity of each hassle occurring within a specific time frame on a three-point sub-scale with a score of one meaning somewhat severe; two, moderately severe; and three, extremely severe. Frequency scores, a count of the items checked, may range from 0 to 117. The cumulated severity is the sum of the values checked on the three-point severity rating scale and may yield a score of 0 to 351. An intensity score yielding a measure of the strength of feeling generated by the average hassle is calculated by dividing the cumulated severity by the frequency. In a 12-month study of stress, coping and emotions, Kanner administered the Hassles Scale monthly for nine consecutive months, finding the Hassles frequency scores to be quite stable over the nine months. Kanner found a high correlation (r=0.95) between frequency and cumulated severity scores (Kanner et al., 1981). In a study of somatic health and the daily routines of living, the Hassles Scale has high test-retest reliability with an

average correlation of .79 for frequency and .48 for intensity between adjacent months over a nine month period (Delongis, Coyne, Dakof, Folkman and Lazarus, 1982). For this study, subjects will be asked to indicate events happening to them for a 24-hour period.

The Uplifts Scale

The Uplifts Scale, also developed at the University of California at Berkeley, was constructed in a manner similar to the Hassles Scale. It is a 135-item questionnaire describing events which lead to satisfaction, joy or peace. Uplifts occurring within a specific time frame are rated on a three-point subscale with a score of one indicating somewhat often; two, moderately often; and three, extremely often. This scale is also scored for frequency and intensity (Kanner et al., 1981).

Uplifts are ranked on a three-point sub-scale of intensity or meaningfulness with a score of one indicating somewhat meaningful; two, moderately meaningful; and three, extremely meaningful. Average test-retest correlations for nine administrations was .72 for frequency and .60 for intensity scores (Delongis, Coyne, Dakof, Folkman and Lazarus, 1982). For this study, the Uplifts Scale was used for a 24-hour period.

The Psychiatric Epidemiology Research Interview Life Events Scale

The Psychiatric Epidemiology Research Interview Life Events Scale was developed by the Social Psychiatry Research Unit at Columbia University. It is a list of 102 items designed to represent the positive and negative experiences of an urban population and samples

several areas of daily living including family, work, legal and community activities. The items were identified by drawing on previous lists, on the researchers' own experiences, and on events reported in two previous studies executed by the researchers. Different kinds of experiences as well as events involving various degrees of importance are included. The characteristics of desirability and undesirability were also specified (Dohrenwend, Krasnoff, Askenasy and Dohrenwend, 1978). A number of these life events have been shown to correlate with the onset of medical and psychiatric illness (Miller, 1981).

A thorough search of the instrument's reliability was executed and no specific values were identified. However, the validity of the scale is currently being assessed (Bruce P. Dohrenwend, Ph.D., personal communication, May, 1985).

Frequency of Anginal Pain Check List

Subjects were asked to record the frequency of experienced anginal pain in one 24-hour period on a pain frequency checklist. A simple time chart requesting a check to be recorded for each episode of pain was utilized.

Demographic Data

The subjects were asked to provide such demographic data as age, educational level, race, marital status and employment status. In addition, they were asked to rate the frequency of anginal pain they experienced over the past year (historical perception of pain) on a scale of high, moderate, low. The high rating was defined as

experienced angina of five or more times per week; moderate, one to four times weekly; and low as three or less episodes per month.

DATA COLLECTION

The subjects meeting the criteria for the study were mailed a packet of materials consisting of

1) introductory letter

2) explanation and directions of study

3) questionnaires and scales

4) stamped return envelope

The subjects were requested to complete the Frequency of Anginal Pain Checklist for a 24-hour period. After completion of the Pain Checklist, they were directed to complete the Hassles and Uplifts Scales for the previous 24 hours, the Psychiatric Epidemiology Research Interview Life Events Scale for the period of September 1, 1984 to September 1, 1985, and the Demographic Data Questionnaire. They were instructed to return all forms to the investigator in the stamped return envelope as soon as possible.

TREATMENT OF THE DATA

Data were subjected to descriptive analytic techniques. Regression and correlational techniques were used to test the stated hypotheses of this study.

Frequency counts and percentages for the categorical variables of age, marital status, employment status and education level were calculated. Frequency of the PERI Life Events and frequency and

severity scores on the Hassles and Uplifts Scales were calculated. Data are displayed in contingency tables. The Digital Equipment Corporation 20 Computer System at Texas Woman's University and the Statistical Packages for the Social Sciences Program (SPSS-X) were utilized for statistical analysis of the data.

CHAPTER IV

ANALYSIS OF DATA

The purpose of this study was to investigate the relationship between self-reported anginal pain, self-reported stressful major life events, and self-reported stressful daily minor events in the cardiac patient. The results obtained from this study could be used by nurses and other health professionals to plan individualized stress and pain management programs for cardiac patients. The results of the data analysis are reported in this chapter. Presented is a description of the sample, the findings, and a summary of the findings. Findings are reported in reference to the total group and according to the source of the subjects.

DESCRIPTION OF THE SAMPLE

Sixty subjects who were contacted by the researcher completed and returned the Demographic Data Sheet, the Psychiatric Epidemiology Research Interview Life Events Scale, the Hassles and Uplifts Scales, and the Frequency of Anginal Pain Checklist. Two sets of data were discarded due to incomplete responses. Fifty-eight sets of data were analyzed. The subjects are described in terms of age, race, marital status, education, current employment status, and history of chest pain.

48

Twenty-eight subjects were patients at a Veterans' Administration Medical Center Cardiology Outpatient Clinic and thirty subjects were patients in a cardiac rehabilitation program sponsored by a large private hospital, and were under the care of private cardiologists. All subjects followed individual medical regimens as prescribed by their physicians. In both settings, professional nurses provided assessment, evaluation, consultation, and direct care as needed.

Age, Race, and Marital Status

The subjects ranged in age from 46 to 64 with a mean age of 57.29 years. Seventy-two percent of the subjects were fifty-five or older. Fifty-one (87.9%) were Caucasian, four (6.9%) were Black, two (3.4%) were American Indian, and one (1.7%) was Hispanic.

Forty-nine (84.5%) of the subjects were married, eight (13.8%) were divorced, and one (1.7%) had never been married. There were no widowers in the group. These data are displayed in Tables 1 and 2.

Table 1

DESCRIPTION OF SUBJECTS

BY AGE

AGE	VETS $x = 58.32$	REHAB $x = 56.33$
45 to 49	3	8
50 to 54	2	3
55 to 59	9	5
60 to 64	14	14
TOTAL	28	30

Table 2

DESCRIPTION OF SUBJECTS

BY RACE AND MARITAL STATUS

	VETS	REHAB
Race		
Caucasian	21	30
Black	4	0
Indian	2	0
Other	1	0
Marital Status		
Married	23	26
Never Married	1	0
Widower	0	0
Divorced	4	4

Education and Current Employment Status

Years of formal education ranged from two to twenty-three years. Twenty subjects (34.5%) completed at least twelve years of school and sixteen (27.6%) completed sixteen or more years of school. The mean educational level of the sample was 12.97 years. Twenty-nine (50%) of the subjects were employed. Twenty-six (44.8%) were employed on a full-time basis while two subjects reported part-time employment, and one was on sick leave but considered himself employed. Twenty-nine (50%) of the subjects were retired.

Comparison of Subjects

There were marked differences between the subjects in the veteran group and the rehabilitation group on several variables. The mean age of the veteran group was slightly higher at 58.32 years while the

Table 3

DESCRIPTION OF SUBJECTS

BY EDUCATION AND EMPLOYMENT

	VETS	REHAB	TOTAL
Education			
0-12 Years	9	0	9 (15.52%)
12-16 Years	17	24	41 (70.69%)
16+ Years	2	6	8 (13.79%)
Mean	11.25	14.56	12.97
Employed			
Full-Time	5	21	26 (44.83%)
Part-Time	2	0	2 (3.45%)
Sick Leave	0	1	1 (1.72%)
Retired	21	8	29 (50.00%)

rehabilitation group's mean age was 56.33 years. The veterans had less formal education. The range was two to eighteen years of formal education with a mean of 11.25 years. However, nineteen (67.86%) had twelve or more years of education. All rehabilitation subjects had at least twelve years of education while sixteen (53.3%) had fourteen or more years of education. The mean educational level for the rehabilitation subjects was 14.56 years and ranged from twelve to twenty-three years. Twenty-one (70%) of the rehabilitation subjects were employed full-time while only five (17.86%) of the veterans were full-time employees. These data are displayed in Table 3.

HISTORICAL PERCEPTION OF PAIN

Historical Perception of Pain

Seventeen (29.3%) of the subjects reported chest pain approximately five or more times per week during the past year. Seven (12.1%) reported pain in the category of one to four times per week and thirty-four (58.6%) reported chest pain three or less times per month. Table 4 presents this data in comparison with the mean frequencies of desirable and undesirable major life events as measured by the Psychiatric Epidemiology Research Interview Life Events Scale.

Table 4

YEARLY PAIN EXPERIENCE AND PERI LIFE EVENTS SCALE

Yearly Pain	Vets	Rehab	Total	fD^1	fUD^2
5+ per week	15	2	17 (29.3%)	4.00	2.59
1-4 per week	5	2	7 (12.1%)	4.29	2.886
3-- per month	8	26	34 (58.6%)	3.88	2.47
Total	28	30	58 (100%)		

[1]frequency of desirable events
[2]frequency of undesirable events

Psychiatric Epidemiology Research Interview Life Events Scale

The frequency of self-reported desirable major life events ranged from one to ten. The mean frequency of desirable life events was 3.97. Subjects experiencing yearly pain five or more times per week had a mean of 4.0 desirable major life events, yearly pain at 1-4 times per

week of 4.29, and yearly pain experienced 3 or less times per month of 3.88. The mean for the self-reported desirable major life events for the veteran subjects is 3.43 and for the rehab subjects is 4.47. (Table 5)

Frequency of self-reported undesirable major life events ranged from none to ten with a mean frequency of 2.55. Twelve subjects reported no undesirable major life events. Group means for self-reported undesirable major life events are: yearly pain experienced five or more times per week, 2.59; yearly pain experienced one to four times per week, 2.86; and the pain experienced three or less times per month, 2.47. The mean for self-reported undesirable major life events for the veteran subjects is 2.39 and the rehab subjects is 2.7. (Table 5)

Table 5

MEAN FREQUENCIES OF PERI EVENTS AND YEARLY PAIN EXPERIENCE

VETS AND REHAB GROUPS

Year Pain	Desirable Events	Undesirable Events
5+ per week	4.00	2.59
1-4 per week	4.29	2.86
3- per month	3.88	2.47
Vets	3.43	2.39
Rehab	4.47	2.70
Total Group	3.97	2.55

Chest Pain During Previous Twenty-Four Hours

Chest pain for the previous twenty-four hours as self-reported on the Twenty-Four Hour Anginal Pain Checklist ranged from none to seven episodes of pain the previous twenty-four hours. Forty-nine (84.44%) subjects reported one or no pain episodes. Six subjects reported two to three episodes of pain in the previous twenty-four hours and three subjects reported four or more episodes of pain. (Table 6)

Table 6

FREQUENCY OF CHEST PAIN REPORTED FOR 24 HOURS

Chest Pain	Vets	Rehab	Total
4+/24 hours	3 (10.71%)	0	3 (5.17%)
2-3/24 hours	5 (17.86%)	1 (3.33%)	6 (10.34%)
0-1/24 hours	20 (71.43%)	29 (96.66%)	49 (84.48%)
Total	28 (100%)	30 (100%)	58 (100%)

Hassles

The frequency of self-reported hassles ranged from zero to seventy-nine. The overall mean frequency was 12.33. The frequency of hassles for subjects reporting zero or one pain episode daily was 13.9, for two to three episodes of pain daily was 14.86, and for those reporting four or more episodes daily, the frequency of hassles was 12.06. One subject reported no daily hassles. The intensity of hassles ranged from zero to 130. The mean intensity of hassles for all subjects was 19.23. The mean intensity of hassles for those subjects

reporting zero or one pain episode daily was 19.42, for two to three episodes daily was 17.0, and for four or more pain episodes daily was 20.66. These data are displayed in Table 7.

Table 7

MEAN FREQUENCIES AND INTENSITIES FOR DAILY HASSLES

Daily Pain	Mean Frequency	Mean Intensity
4+	12.06	20.66
2-3	14.86	17.0
0-1	13.9	19.42
Total Subjects	12.33	19.23

Uplifts

The frequency of the occurrence of self-reported uplifts ranged from zero to eighty-seven. The frequency of uplifts for the subjects reporting zero or one pain episode daily was 19.93; the subjects reporting two to three episodes daily was 13.0; and the group reporting four or more episodes daily was 24.0. The mean frequency of uplifts for the total example was 19.41. The intensity of uplifts ranged from zero to 159. Three subjects reported no uplifts. The mean intensity of uplifts for the subjects reporting zero to one episodes of pain was 36.7; the group reporting two to three episodes daily was 27.5; and the subjects reporting four or more episodes of pain daily was 48.33. The

mean intensity for the total sample was 36.33. These data are displayed in Table 8.

Table 8

MEAN FREQUENCIES AND INTENSITIES FOR DAILY UPLIFTS

Daily Pain	Mean Frequency	Mean Intensity
4+	24.0	48.33
2-3	13.0	27.5
0-1	19.93	36.7
Total Subjects	19.41	36.33

FINDINGS

Hypotheses

The following hypotheses were investigated:

1) There is no statistically significant relationship between self-reported yearly anginal pain experience and self-reported desirable major stressful life events as measured by the Psychiatric Epidemiology Research Interview Life Events Scale.

2) There is no statistically significant relationship between self-reported yearly anginal pain experience, self-reported undesirable major stressful life events as measured by the Psychiatric Epidemiology Research Interview Life Events Scale.

3) There is no statistically significant relationship between self-reported 24-hour frequency of anginal pain and the perceived

intensity of daily stressful events as measured by the

    a. Hassles Scale

    b. Uplifts Scale

4)   There is no statistically significant relationship between self-reported 24-hour frequency of anginal pain and the frequency of daily stressful events as measured by the

    a. Hassles Scale

    b. Uplifts Scale

Analysis of the Data

Pearson correlation coefficients were calculated to identify the relationships among self-reported daily and yearly pain and the self-reported desirable and undesirable major stressful life events and the frequency and intensity of self-reported stressful minor life events. Results of the correlations for the four hypotheses of this study were found to be non-significant; therefore, the null hypotheses were not rejected. Correlations, means and standard deviations are displayed in Table 9.

Additional Findings

A correlational matrix of the eight variables was constructed utilizing the Pearson Product Moment correlation coefficient. The correlation matrix is presented in Table 10.

Table 9

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATIONS
FOR SELF-REPORTED STRESSFUL EVENTS

	Yearly Pain N=58	Daily Pain N=58	x	S.D.
Major Life Events				
Desirable	-0.0296 p = .413	-0.1823 p = .085	3.9655	2.2553
Undesirable	-0.0291 P = .414	0.1202 p = .184	2.5517	2.2647
Hassles				
Frequency	-0.0045 p = .487	0.1240 p = .177	11.9828	11.7540
Intensity	-0.1660 p = .106	0.0997 p = .228	1.4750	0.4263
Uplifts				
Frequency	0.2021 p = .064	0.0707 p = .299	19.6552	16.6022
Intensity	-0.0910 p = .248	0.1390 p = .149	1.8134	0.6648

Table 10

INTERCORRELATIONS OF THE EIGHT VARIABLES UNDER INVESTIGATION
(N=58)

	Hassles f	Hassles I	Uplifts f	Uplifts I
Yearly Pain	-0.0043 p = 0.487	-0.1835 p = 0.084	0.2103 p = 0.087	-0.0614 p = 0.324
PERI Desirable	0.2170 *p = 0.051	-0.0281 p = 0.417	0.3459 *p = 0.004	0.0156 p = 0.454
PERI Undesirable	0.5889 *p = 0.000	0.3801 *p = 0.002	0.3150 *p = 0.008	0.0172 p = 0.449
Daily Pain	0.1240 p = 0.177	0.0997 p = 0.228	0.0707 p = 0.299	0.1390 p = 0.149

*significant findings

The relationship between PERI undesirable major life events and Hassle frequency, 0.5889 (p = 0.000), stands out as the strongest correlation among the eight variables significant at the 0.000 level of confidence, accounting for 36% of the variance. Other correlations identified at or above the 0.05 level of significance were between PERI desirable and Hassles frequency (0.2170, p = 0.051), PERI undesirable and Hassles intensity (0.3801, p = 0.002), PERI desirable and Uplifts frequency (0.3459, p = 0.004), and PERI undesirable and Uplifts frequency (0.3150, p = 0.008). It is interesting to note that the variables of PERI desirable major life events and Hassles frequency and PERI undesirable major life events and frequency of Uplifts yielded significant positive relationships statistically while standing at opposite ends of a continuum conceptually.

The one-way analysis of variance was applied to the data of this study. The significant findings were as follows: the Vet group reported significantly more pain within a 24-hour period ($F_{1,57}$ = 10.240, p = 0.0023), the employed subjects reported significantly more pain in a 24-hour period ($F_{1,57}$ = 12.259, p = 0.009), the highest incidence of reported yearly pain was found to be significant with those subjects who had more education ($F_{1,57}$ = 3.819, p = 0.0280). In addition, the vet group reported a significantly higher incidence in frequency of Uplifts ($F_{1,57}$ = 4.297, p = 0.0428), and the employed subjects had a significantly greater amount of undesirable stresses ($F_{1,57}$ = 8.061, p = 0.006).

A multiple regression analysis was carried out to determine if any of the variables of this study were predictive of increased pain. The first identified predictor was group membership ($F_{1,56}$ = 29.75592, p = 0.0000); secondly, the self-reported daily pain was a predictor of increased yearly pain ($F_{2,55}$ = 21.59318, p = 0.0000); thirdly, in increased PERI desirable major life events, frequency was a predictor of increased yearly pain ($F_{3,54}$ = 16.68455, p = 0.0000). In addition, as in the ANOVA findings, employment status predicted an increased daily pain ($F_{2,55}$ = 13.307, p = 0.0000) and finally, increased education was predictive of an increased daily pain ($F_{3,54}$ = 12.07491, p = 0.0000).

Hassles Items Selected

Of interest are the Hassles items selected most frequently by the subjects of this study. The Vets selected fewer different items (73 compared to 104 items selected by the Rehab subjects). Twelve Hassles

were not selected by any subject and there was little response to the question, "Have we missed any of your hassles?" Responses to the question, "Changes in your life that affected how you answered this scale," included: "death of son;" "past heart attack;" "being in a wheelchair;" "being sober for 15 months;" "have had several strokes;" and "a religious conversion experience." Tables 11 and 12 display those items selected most frequently by both groups and contrasts them with the frequency of items chosen by the other group.

Table 11

HASSLES SELECTED MOST FREQUENTLY BY REHAB SUBJECTS
COMPARED TO VET SUBJECTS

Item	Cardiac Rehab N=30	Veterans N=28
5. Troubling thoughts about your future	12	10
10. Concerns about owing money	12	4
91. Concerns about weight	11	15
94. Not enough personal energy	11	15
56. Concerns about health in general	9	20
25. Trouble relaxing	8	15
49. Side effects of medication	8	7

Table 12

HASSLES SELECTED MOST FREQUENTLY BY VETS
COMPARED TO REHAB SUBJECTS

Item		Veterans N=28	Cardiac Rehab N=30
56.	Concerns about health in general	20	9
77.	Difficulty seeing or hearing	19	4
67.	Declining physical abilities	16	7
25.	Trouble relaxing	15	8
91.	Concerns about weight	15	11
94.	Not enough personal energy	15	11
48.	Physical illness	14	6
72.	Not geeting enough sleep	13	4
39.	Too much time on hands	12	2
71.	Not getting enough rest	12	3

Uplifts Items Selected

All but five uplifts items were selected by at least one subject. The Vet subjects selected 103 different items and the Rehab subjects selected 128 different items. The most frequently selected uplifts are displayed in Tables 13 and 14. Responses to the question, "Have we missed any of your uplifts?" elicited such responses as: "fishing;" "football games;" "hunting and fishing." Responses to the question, "Has there been a change in your life that affected how you answered this scale?" included "fair health;" "no problems of any kind;" and "happily married."

Table 13

REHAB SUBJECTS' UPLIFTS COMPARED WITH VETS

Item		Cardiac Rehab	Veterans
11.	Feeling healthy	18	10
1.	Getting enough sleep	17	22
134.	Hugging and/or kissing	17	6
132.	Exercising	16	5
36.	Having enough (personal) energy	12	6
104.	Car working/running well	12	3
116.	Fresh air	12	4
119.	Giving love	12	3

Table 14

VETERANS' UPLIFTS COMPARED WITH REHAB SUBJECTS

Item		Veterans	Cardiac Rehab
1.	Getting enough sleep	22	17
114.	Praying	18	8
64.	Doing yardwork/outside housework	17	10
32.	Friendly neighbors	15	7
15.	Being with children	14	6
10.	Being rested	13	5
51.	Spending time with family	13	8

CHAPTER V

DISCUSSION, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The problem of this study was to determine whether a relationship between self-reported anginal pain and self-reported stressful major life events and stressful minor daily events existed in the cardiac patient. The theoretical framework was the stress-disease theory which proposed that a disturbance of homeostasis may be induced by physiological or psychological stressors which cause activation of the sympathetic nervous system and prepares the body to take defensive measures. Stress has been implicated as an etiological factor in several types of heart disease and the physiological stress response, by increasing the need for myocardial oxygen, seriously affects a heart already compromised by a reduced blood supply. Fifty-eight subjects with anginal pain participated in the study.

Already presented are a comprehensive review of the literature, research methodology, and presentation and analysis of the data used to test the null hypotheses which were formulated. This chapter presents a discussion of the findings, conclusions, implications, and recommendations for further research.

DISCUSSION OF FINDINGS

Hypotheses

The first hypothesis, which proposed that there was no

significant relationship between self-reported yearly anginal pain experiences and self-reported desirable stressful major life events, was not rejected. Correlational techniques demonstrated a statistically non-significant negative relationship between self-reported yearly pain and desirable major life events. The second hypothesis, formulated to determine if a relationship existed between self-reported yearly anginal pain and undesirable major stressful life events, also demonstrated a statistically non-significant negative correlation and was not rejected. The third hypothesis, proposing no relationship between self-reported 24-hour frequency of anginal pain and the perceived intensity of daily stressful events, was found to have no statistically significant correlation; therefore, was not rejected. The fourth hypothesis formulated to determine the existence of a relationship between the self-reported 24-hour frequency of anginal pain and the frequency of daily stressful events was not rejected as no statistically significant relationship was demonstrated.

One explanation for the inability to reject the null hypotheses in this study was the existing medical definition of angina pectoris, the wide range of characteristics which describe anginal pain as well as the possible operation of the denial mechanism at either a conscious or unconscious level by the individual. Several subjects identified their chest pain as being due to other factors, i.e. bad lungs or arthritis, although all subjects had documented angina pectoris as well as extensive cardiovascular disease.

The lack of sensitivity of the research instruments may have been another significant factor operating in this study. There was also

concern regarding the accuracy and reliability of respondent recall of retrospective events (Monroe, 1982). Some differences in responses to the instruments may have been due to individual interpretation or reporting differences rather than to actual differences in responses to event experiences. Various demographic characteristics as well as the salience of events may have also influenced respondent recall (Funch and Marshall, 1984). Other sources of variability of respondent recall may have included interpersonal factors or physical conditions existing at the time of data collection.

The small sample size and non-random selection process may not have provided sufficient data and appropriate sampling to demonstrate relationships. It is also important to note that the sample population differed widely on several variables. Although all subjects met the established criteria for the study, one-half of the subjects were younger, better educated and may have been more highly motivated as evidenced by their prior participation in a cardiac rehabilitation program. Education has been found to be associated with social stress and the risk of coronary artery disease (Jenkins, 1971) as well as having been found to be a significant factor in the recall of past events (Funch and Marshall, 1984). Participation in a cardiac rehabilitation program may have had a direct effect on the health status of one-half of the participants by enhancing physical fitness and by stimulating significant improvement in psychological distress (Bohachick, 1984).

Correlational Matrix

A correlational matrix was used to present intercorrelations of all combinations of the variables. The relationship between undesirable major life events and the frequency of stressful minor daily events (hassles) stands out as the strongest correlation among the eight variables of this study. Other significant correlations were between desirable major life events and hassles frequency, undesirable major life events and hassles intensity, desirable major life events and frequency of desirable minor daily events (uplifts) and between undesirable major life events and the frequency of uplifts. Since significant positive relationships were identified between these variables occupying opposite ends of a continuum of desirability-undesirability, one must consider that the subjective impact of an event is based on some other criterion than its perceived desirability. This finding was in keeping with Lazarus' hypothesis that individual vulnerability to stress is heavily influenced by one's appraisal of the significance of events for one's well-being (Lazarus, 1984).

ANOVA Findings

The one-way analysis of variance was applied to the data. Significant findings were that the Vets reported more anginal pain within a 24-hour period and a higher frequency of uplifts. The employed subjects reported more pain and a greater amount of undesirable stress, and the subjects with more education had the highest incidence of reported yearly pain.

A multiple regression analysis of the data supports the following findings:

1) group membership is predictive of both daily and yearly anginal pain.

2) self-reported daily pain is predictive of higher yearly pain.

3) the frequency of desirable major life events is a predictor of increased yearly pain.

4) employment and increased education are predictive of increased daily pain.

CONCLUSIONS

A correlational design was used to study the relationship among the relevant variables. When relationships do exist, correlation does not imply causation and cannot be used to speak to the effect of one variable upon another (Waltz and Bausell, 1981). Failure to demonstrate a relationship between variables that empirically appear related does not indicate that the formulations being investigated should be discarded but that such findings should be explored from a different perspective.

Although the four null hypotheses of this study were not rejected, the relationship of stress and anginal pain cannot be disregarded. The study's limitations, the small, non-random sample which may not have been adequately representative of the population, the possible lack of sensitivity of the research instruments, and the inherent problems of self-reported data may have all clouded the existing relationship between stressful events and anginal pain. The imprecise definition of

anginal pain, which includes symptoms associated with other syndromes such as chronic lung disease, may have contributed to the subjects' inability to identify and accurately report anginal pain episodes. Psychological defenses such as denial may have played an additional limiting role in the accuracy of self-reported anginal pain or stressful events.

A more accurate measurement of anginal pain would have to include a more precise, descriptive, and discriminating definition. Such a discriminating anginal pain definition along with the identification of subjects utilizing the psychological defenses of denial would provide a more accurate picture of the effects of stress on anginal pain experiences.

This study also attempted to identify demographic variables and their relationship to and predictability of anginal pain. Membership in a private rehabilitation program was found to be predictive of a lower self-reported daily pain. This finding may be explained by the involvement of the rehabilitation individuals in daily active exercise programs. Such active physical exercise places the body under physiological stress which activates the individual's endogenous opiate system (Farrell, 1985) and hence, decreases or eliminates the experience of pain. In addition, the psychological defense of denial has been hypothesized to also activate the endorphin system response and may play a combined role with other factors in providing endogenous narcotization of pain (Prince et al., 1982).

Employment was predictive of greater reported daily pain and undesirable stresses. These variables appear to loosely support the

research on job factors and coronary artery disease along with pointing attention to personality type. Case et al. (1985) suggested that a more specific personality characteristic than the Type A personality be identified in relation to employment stresses.

It is interesting to note that the Vet group with considerably fewer employed individuals still reported more 24-hour daily pain than the Rehabilitation group who were all employed. This seeming contradiction can be explained by the fact that, while the Rehabilitation group was involved in an active formal exercise program theoretically activating the endogenous opiate system, the Vet group was not involved in such a formal program. Another explanation may be the difference in sick role expectations of the private Rehabilitation and Veterans groups.

Higher educational status as a predictor of increased yearly pain in this study supports Jenkins' (1977) proposition that there is a positive association between atherosclerosis, increased education, and high status occupations. The Rehabilitation group, with a higher educational level and a higher rate of employment, would be the predictably logical candidates for greater amounts of daily and yearly pain. These prediction factors did not reach their logical conclusion. In fact, the Rehabilitation group was lower in self-reported daily and yearly pain. Explanation of this clear contradiction cannot be made by any one variable. A combination of a formal rehabiltiation program, individual motivation, the endogenous opiate theory, sick role expectations, and psychological defenses must all be considered in a multifaceted theory of stress and anginal pain.

IMPLICATIONS FOR NURSING

Stress as a factor in health and illness is supported empirically and theoretically. Stress has been identified as one of the nine components of the holistic nursing model (Blattner, 1981) and nurses have long recognized the necessity of viewing the individual as an integrated entity when the goal is a maximal level of wellness. Although major life events are largely outside the control of the individual, daily happenings present an excellent opportunity for identification of individual pain precipitating factors and modification of the stress-pain cycle through the assessment of stress-producing activities and events of daily living.

Although this study did not statistically demonstrate a significant relationship between life events and anginal pain, it did point to certain factors which appear relevant in the experience of anginal pain. One of these factors is the membership in a formal cardiac rehabilitation program. The effects of possible activation of the endogenous opiate system through regular planned cardiac exercises may decrease anginal pain by providing endogenous narcotization. The nurse must recognize that the variable of motivation to participate in regular planned exercise may be a factor in decreasing pain by stimulating improved coping and the individual's sense of control. The sick role and sick role expectations of an individual by the family, health professionals, and health care institutions may influence self-perception, behavior and motivation of the individual. High priority nursing actions msut include not only a thorough assessment of the

activities and events of an individual's daily life but also an identification of sick role expectations and an exploration of individual personality variables and their role in triggering the stress response.

Although major life events are largely outside the control of the individual, daily activities present an excellent opportunity for modification and stress reduction through assessment of the personal meaning of events and implementation of therapeutic intervention.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations for further research are suggested:

1) Further studies of the relationship between life events and anginal pain should be conducted utilizing a larger sample population and more precise research instruments.

2) Studies utilizing physiological measurements of stress.

3) Further studies clarifying the role of psychosocial stressors indigenous to various diagnostic groups.

4) Studies of the role of defense mechanisms in evoking the endogenous opiate system of the body.

5) Studies of the personal characteristics of individuals with anginal pain.

REFERENCES

References

Amir, S. (1982). Involvement of endogenous opioids with forced swimming-induced immobility in mice. Physiological Behavior, 28, 249-251.

Appley, M.H. & Trumbull, R. (Eds.) (1967). Psychological stress. New York: Appleton-Century-Crofts.

Baldree, K.S., Murphy, S.P. & Powers, M.J. (1982). Stress identification and coping patterns in patients on hemodialysis. Nursing Research, 31(2), 107-112.

Bedsworth, J.A. & Molen, M.T. (1982). Psychological stress in spouses of patients with myocardial infarction. Heart and Lung, 11(5), 450-456.

Blattner, B. (1981). Holistic Nursing. Englewood Cliffs: Prentice-Hall, Inc.

Bohachick, Patricia (1984). Progressive relaxation training in cardiac rehabilitation: Effect on psychologic variables. Nursing Research, 33(5), 283-287.

Bourbonnais, F.E. & Mackay, R.C. (1981). The influence of nursing interventions on chest pain. Nursing Papers: Perspectives in Nursing, 13(3), 38-48.

Bradford, R.J. (1981, October-December). Relationships among marital adjustment, chest pain and anxiety in myocardial infarction patients. Issues in Mental Health Nursing, 3(4).

Cannon, W.B. (1932). The wisdom of the body. New York: W. W. Norton and Co.

Case, R.B., Heller, L.L., Case, N.B., Moss. A.J. & The Multi-Center Post-Infarction Research Group (1985). Type A behavior and survival after acute myocardial infarction. The New England Journal of Medicine, 312(12), 737-741.

Casey, K.L. & Melzack, R. (1967). Neural mechanisms of pain: A conceptual model. In Way, E.L. (Ed.), New Concepts in Pain and Its Clinical Management. Philadelphia: F.A. Davis Co.

Chesney, M.A., Black, G.W. & Chadwick, J.H. (1981). Psychological correlates of the Type A behavior pattern. Journal of Behavioral Medicine, 4, 217-229.

Clark, M.C. (1975). Chest pain. Heart and Lung, 4(6).

Cooper, T. & The Review Panel on Coronary Prone Behavior and Coronary Heart Disease (1981). Coronary prone behavior and coronary heart disease: A critical review. Circulation 63:1199-1215.

Danner, C.A. (1981). Chronic pain: Reduction through hypnosis and TENS. Doctoral Dissertation, Texas Woman's University, Denton, Texas.

DeLongis, A., Coyne, J.C., Dakof, G., Folkman, S. & Lazarus, R.S. (1982). Relationship of daily hassles, uplifts and major life events to health status. Health Psychology, 1(2), 119-136.

DeVillier, B. (1984, March). Physiology of stress: Cellular healing. Critical Care Quarterly, 15-20.

Diers, D. (1979). Research in Nursing Practice. Philadelphia: J.B. Lippincott Co.

Diers, D., Schmidt, R.L., McBride, M.A.B., & Davis, B.L. (1972). The effect of nursing interaction on patients in pain. Nursing Research, 21(5), 419-428.

Dimsdale, J.E. & Moss, J. (1980). Short-term catecholamine response to psychological stress. Psychosomatic Medicine, 42, 493-497.

Dohrenwend, B.S. & Dohrenwend, B.P. (eds.) (1974). Stressful Life Events: Their Nature and Effects. New York: John Wiley and Sons, Inc.

Dohrenwend, B.S., Krasnoff, L., Askenasy, A.R. & Dohrenwend, B.P. (1978). Exemplification of a method for scaling life events: The PERI life events scale. Journal of Health and Social Behavior, 19(6), 205-229.

Dolphin, N.W. (1983). Neuroanatomy and neurophysiology of pain: Nursing implications. International Journal of Nursing Studies, 20(4), 255-263.

Dorian, B. & Taylor, C.B. (1984, October). Stress factors in the development of coronary artery disease. Journal of Occupational Medicine, 26(10), 747-757.

Dreyfuss, F. & Czaczkes, J.W. (1959). Blood cholesterol and uric acid of healthy medical students under stress of an examination. Archives of Internal Medicine, 103, 708-711.

Duckitt, J. & Broll, T. (1983). Life stress, personality and illness behavior: A prospective study. Psychological Reports, 53, 51-57.

Eliot, R.S. (1979). Stress and the major cardiovascular diseases. New York: Futura Publishing Co.

Epstein, S. (1979). The stability of behavior: On predicting most of the people much of the time. Journal of Personality and Social Psychology, 37, 1097-1126.

Farrell, P.A. (1985). Exercise and endorphins-male responses. Medicine and Science in Sports and Exercise, 17, 89-93.

Feigl, E.O. (1983). Coronary physiology. Physiological Review, 63, 1-205.

Frederickson, Robert C.A., Burgis, V., Harrell, C.E. & Edwards, J.D. (1978, March 24). Dual actions of substance P on nociception: Possible role of endogenous opioids. Science, 199, 1359-1362.

Friedman, M.D. & Rosenman, R.H. (1974). Type A behavior and your heart. New York: Knopf.

Funch, D.P. & Marshall, J.R. (1984, December). Measuring life stress: Factors affecting fall-off in the reporting of life events. Journal of Health and Social Behavior, 25, 453-464.

Glass, D.C. (1977, March/April). Stress, behavior patterns, and coronary disease. American Scientist, 65.

Goldberg, D.P. (1972). The detection of psychiatric illness by questionnaire. New York: Oxford University Press.

Goldstein, Avram (1976, September 17). Opioid peptides (endorphins) in pituitary and brain. Science, 193, 1081-1086.

Goldstein, Avram (1978). Endorphins. The Sciences, 18(3), 14-19.

Grevert, Priscilla & Goldstein, Avram (1978, March 10). Endorphins: Naloxone fails to alter experimental pain or mood in humans. Science, 199, 1093-1095.

Grossman, A. & Sutton, J.R. (1985). Endorphins: What are they? How are they measured? What is their role in exercise? Medicine and Science in Sports and Exercise, 17(1), 74-81.

Grossman, P. (1983). Respiration, stress and cardiovascular function. Psychophysiology, 20(3), 284-300.

Guillemin, R., Vargo, T., Rossier, J., Minick, S., Ling, N., Rivier, C., Vale, W. & Bloom, F. (1977, September 30). Beta-endorphin and adrenocorticotropin are secreted concomitantly by the pituitary gland. Science, 197, 1367-1369.

Guyton, A.C. (1981). Textbook of medical physiology, Sixth edition. Philadelphia: W.B. Saunders Co.

Guzzetta, C.E. (1979). Relationship between stress and learning. Advances in Nursing Science, 1(4), 35-49.

Haughey, B.P., Brasure, J., Maloney, M.C., Graham, S. (1984, July). The relationship between stressful life events and electrocardiogram abnormalities. Heart and Lung, 13(4).

Holmes, T.H. & Rahe, R.H. (1967). The social readjustment rating scale. Journal of Psychosomatic Research, 11:213-18.

Huck, L.W., Cormier, W.H., & Bounds, W.G. (1974). Reading Statistics and Research. New York: Harper and Row.

Hughes, G.S., Lichstein, P.R., Whitlock, D. & Harker, C. (1984). Response of plasma beta-endorphins to transcutaneous electrical nerve stimulation in healthy subjects. Physical Therapy, 64(7), 1062-1066.

Hughes, J. (1975). Isolation of an endogenous compound from the brain with pharmacological properties similar to morphine. Brain Research, 88, 295-308.

Huhman, M. (1982, July). Endogenous opiates and pain. Advances in Nursing Science, 62-71.

Jalowiec, A. & Powers, M.J. (1981). Stress and coping in hypertensive and emergency room patients. Nursing Research, 30(1), 10-15.

Jenkins, C.D. (1971). Psychologic and social precursors of coronary disease. New England Journal of Medicine, 284(5), 307-317.

Jenkins, C.D. (1976). Recent evidence supporting psychologic and social risk factors for coronary disease. The New England Journal of Medicine, 294(18), 987-994.

Jenkins, C.D. (1979, December). Psychosocial modifiers of response to stress. Journal of Human Stress, 3-15.

Jenkins, C.D., Stanton, B.A., Klein, M.J., Savageau, J.A. & Harken, D.E. (1983, May). Correlates of angina pectoris among men awaiting coronary by-pass surgery. Psychosocial Medicine, 45(2), 141-153.

Jessell, T.M. & Iverson, L.L. (1977, August 11). Opiate analgesics inhibit substance P release from rat trigeminal nucleus. Nature, 268, 549-551.

Johnson, J.E. (1972, November-December). Effects of structuring patients' expectations on their reactions to threatening events. Nursing Research, 21(6).

Johnson, J.E. & Rice, V.H. (1974, May-June). Sensory and distress components of pain: Implications for the study of clinical pain. Nursing Research, 23(3).

Kanner, A.D., Coyne, J.C., Schaefer, C., & Lazarus, R.S. (1981). Comparison of two modes of stress measurement: Daily hassles and uplifts versus major life events. Journal of Behavioral Medicine, 4(1), 1-39.

Kloster, F.E. & Bristow, J.D. (1985). Management of stable and unstable angina. In Connor, W.E. & Bristow, J.D. (Eds.), Coronary Heart Disease: Prevention, Complications and Treatment. Philadelphia: J.B. Lippincott Co.

Kobasa, L.C. & Purcetti, M.C. (1983). Personality and social resources in stress resistance. Journal of Personality and Social Psychology, 45(4), 839-850.

Krantz, D.S. & Manuck, L.B. (1984). Acute psychophysiologic reactivity and risk of cardiovascular disease: A review and methodologic critique. Psychological Bulletin, 96(3), 435-464.

Lazarus, R.S. (1975). Psychological stress and coping in adaptation and illness. In Weiss, S.M. (Ed.), Proceedings of the National Heart and Lung Institute Working Conference on Health Behavior. Bethesda: National Institute of Health.

Lazarus, R.S. (1977). Proceedings of the National Heart and Lung Institute working conference on health behavior, DHEW (NIH, 77-868), Washington, D.C.

Lazarus, R.S. (1980). The stress and coping paradigm. In Eisdorfer, C., Cohn, D., & Kleinman, A. (Eds.), Conceptual Models for Psychopathology. New York: Spectrum.

Lazarus, R.S. (1984). Puzzles in the study of daily hassles. Journal of Behavioral Medicine, 7(4), 375-389.

Lazarus, R.S. & Launier, R. (1978). Stress related transactions between person and environment. In Pervin, L.A. & Lewis, M. (Eds.), Perspectives in Interactional Psychology. New York: Plenum Publishing Corporation, 287-327.

Levine, J.D., Gordon, N.C., Jones, R.T., & Fields, H.L. (1978). The narcotic antagonist naloxone enhances clinical pain. Nature, 272, 826-827.

Lewis, J.W., Cannon, J.T. & Liebeskind, J.C. (1980, May 9). Opioid and nonopioid mechanisms of stress analgesia. Science, 208, 623-625.

Lindblom, V. & Tegner, R. (1979). Are the endorphins active in clinical pain patients? Narcotic antagonism in chronic pain patients. Pain, 7, 65-68.

Marriner, A. (1981). Research design: Survey descriptive. In Krampitz, S.D. & Pavlovich, N. (Eds.), Readings for Nursing Research. St. Louis: C.V. Mosby Co.

Matteson, M.T. & Ivancevich, J.M. (1982, August). Type A and B behavior patterns and self-reported health symptoms and stress: Examining individual and organizational fit. Journal of Occupational Medicine, 24(8), 585-589.

Mayou, R. (1973). Chest pain, angina pectoris and disability. Journal of Psychosomatic Research, 17, 287-291.

McCaffery, M. (1979). Nursing management of the patient with pain, 2nd edition. Philadelphia: J.B. Lippincott.

Mechanic, D. (1976, June). Stress, illness and illness behavior. Journal of Human Stress, 2-6.

Melzack, R. & Chapman, C.R. (1973). Psychologic aspects of pain. Postgraduate Medicine, 53(6), 69-75.

Melzack, R. & Wall, P.D. (1965). Pain mechanisms: A new theory. Science, 150, 971-979.

Meyer, Adolf (1951). The Collected Papers of Adolf Meyer, Vol. III, edited by Eunice E. Winters. Baltimore: The Johns Hopkins Press.

Mikhail, A. (1981, June). Stress: A psychophysiological conception. Journal of Human Stress, 9-15.

Miller, T.W. (1981). Life events scaling: Some clinical methodological issues. Nursing Research, 30(5), 316-320A.

Monat, A. & Lazarus, R.S. (1977). Stress and coping. New York: Columbia University Press.

Monroe, S.M. (1982). Life events and disorder: Event-symptom associations and the course of disorder. Journal of Abnormal Psychology, 91(1), 14-24.

Monroe, S.M. (1983). Major and minor life events as predictors of psychological distress: Further issues and findings. Journal of Behavioral Medicine, 6(2), 189-205.

Mulvey, A. & Dohrenwend, B.S. (1983). The relation of stressful life events to gender. Issues in Mental Health Nursing 5(1-4), 219-237.

O'Brien, W.J., Rutan, F.M., Sanborn, C. & Omer, G.E. (1984). Effects of transcutaneous electrical nerve stimulation on human blood beta-endorphin levels. Physical Therapy, 64(9), 1367-1374.

Orth-Gomer, K. & Ahlbom, A. (1980, March). Impact of psychological stress on ischemic heart disease when controlling for conventional risk indicators. Journal of Human Stress, 7-15.

Ostfeld, A.M. (1971). The interaction of biological and social variables in cardiovascular disease. New England Journal of Medicine, 307-317.

Paykel, E.S., Prusoff, B.A. & Uhlenhuth, E.H. (1971). Scaling of life events. Archives of General Psychiatry, 25, 340-347.

Polit, D.F. & Hungler, B.P. (1983). Nursing research: Principles and methods. Philadelphia: J.B. Lippincott Co.

Prince, R., Frasure-Smith, N. & Rolicz-Woloszyk, E. (1982). Life stress, denial and outcome in ischemic heart disease patients. Journal of Psychosomatic Research, 26(1), 23-31.

Raab, W. (1971). Cardiotoxic biochemical effects of emotional-environmental stressors: Fundamentals of psychocardiology. In Lennart Levi (Ed.), Society, Stress and Diseases. London: Oxford University Press.

Rabkin, J.G. & Struening, E.L. (1976). Life events, stress and illness. Science, 194, 1013-1020.

Rahe, R.H. (1969). Multi-cultural correlations of life change scaling: America, Japan, Denmark, and Sweden. Journal of Psychosomatic Research, 13, 191-195.

Rahe, R.H. & Arthuer, R.J. (1968). Life-change patterns surrounding illness. Journal of Psychosomatic Research, 11:341-345.

Rahe, R.H., Rubin, R.T., Gunderson, E.K.E. & Arthur, R.J. (1971). Psychological correlates of serum cholesterol in men. Psychosomatic Medicine, 33, 399-410.

Randolph, G.L. (1984). Therapeutic and physical touch: Physiological response to stressful stimuli. Nursing Research, 33(1), 33-36.

Redfield, J. & Stone, A. (1979). Individual viewpoints of stressful life events. Journal of Consulting and Clinical Psychology, 47(1), 147-154.

Ruch, L.O. (1977). A multidimensional analysis of the concept of life change. Journal of Health and Social Behavior, 18, 71-83.

Scherwitz, L., McKelvain, R., Lamar, C., Patterson, J., Dutton, L., Yusim, S., Lester, J., Kraft, I., Rochelle, D. & Leachman, R. (1983). Type A behavior, self-involvement and coronary atherosclerosis. Psychosomatic Medicine, 45, 47-57.

Selye, H. (1975). Confusion and controversy in the stress field. Journal of Human Stress, 1(2), 37-44.

Selye, H. (1976). Stress in health and disease. Boston: Butterworths.

Selye, H. (1956). The stress of life. New York: McGraw-Hill.

Shyu, B.C., Andersson, S.A. & Theoren, P. (1982). Endorphin-mediated increase in pain threshold induced by long-lasting exercise in rats. Life Science, 30, 833-840.

Sigler (1967). EKG changes observed on recall of past emotional disturbance. British Journal of Medical Psychology, 40, 55.

Taggart, P. & Carruthers, M. (1971). Endogenous hyperlipidemia induced by emotional stress of race driving. Lancet I, 363-366.

Theorell, T. & Akerstedt, T. (1976). Day and night work: Changes in cholesterol, uric acid, glucose and potassium in serum and in circadian patterns of urinary catecholamine excretion. Acta Medica Scand, 200, 47-53.

Thom, T.J., Kannel, W.B., & Feinleib, M. (1985). Factors in the decline of coronary heart disease mortality. In Connor, W.E. & Bristow, J.D. (Eds.), Coronary Heart Disease: Prevention, Complications and Treatment. Philadelphia: J.B. Lippincott.

van Doornen, L.J.P. & Orlebeke, K.F. (1982, December). Stress, personality and serum cholesterol level. Journal of Human Stress, 24-29.

Waltz, C. & Bansell, R.B. (1981). Nursing research: Design statistics and computer analysis. Philadelphia: F.A. Davis Co.

Wall, P.D. (1976). Modulation of pain by nonpainful events. In J.J. Bonica and D. Albe-Fessard (Eds.), Advances in Pain Research and Therapy, Vol. 1. New York: Raven Press, 1-15.

Weber, K.T. & Janicki, J.S. (1979). The metabolic demand and oxygen supply of the heart: Physiologic and clinical considerations. American Journal of Cardiology, 44:722.

Wolff, H.G. (1947). Protective reaction patterns and disease. Annals of Internal Medicine, 27(6), 944-969.

APPENDICES

APPENDIX A

CONSENT FORMS

TWU Texas Woman's University

THE GRADUATE SCHOOL

October 10, 1985

Ms. Anna Ferguson
813 North Luther Rd.
Harrah, OK 73045

Dear Ms. Ferguson:

Thank you for providing the materials necessary for the final approval of your prospectus in the Graduate Office. I am pleased to approve the prospectus, and I look forward to seeing the results of your study.

If I can be of further assistance, please let me know.

Sincerely yours,

Leslie M. Thompson
Provost

tb

cc Dr. Patricia Mahon ✓
   Dr. Anne Gudmundsen

The
University of Oklahoma

Oklahoma City Campus - Health Sciences Center

INSTITUTIONAL REVIEW BOARD

APPROVED: August 26, 1985

IRB #:   02855

TITLE: Identification of Stressful
          Event Mediators of Pain in
          the Cardiac Patient.

Anna Ferguson, R.N. M.S.
College of Nursing
CNB 316

Dear Ms. Ferguson:
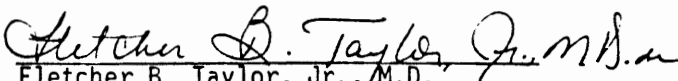
The Institutional Review Board reviewed the above-captioned application which will involve human subjects and approved the study and the informed consent form. It is the opinion of this Board that the rights and welfare of the individuals who are to be studied will be completely respected; that informed consent will be obtained in a manner consistent with the Code of Federal Regulations, Title 45, Part 46, "Protection of Human Subjects" of March 8, 1983, as amended, and that the risks to the individuals are so outweighed by the benefits to the subject and the importance of the knowledge to be gained that it warrants the decision to allow the subjects to accept these risks.

The Institutional Review Board would like to call your attention to the following obligations as Principal Investigator of this study. Under the terms of our approved Institutional Assurance to the Department of Health and Human Services, you must provide us with a progress report at the termination of the study, or at the annual anniversary date of this approval, whichever comes first. If the study will be continued beyond the initial year, an annual review by the Institutional Review Board is required, with a progress report constituting an important part of the review. The Office of Research Administration will notify you of the anniversary report.

Any substantive changes in the protocol, such as a change in the principal investigator, procedure or number of subjects, should be reported immediately to the Institutional Review Board. These conditions are spelled out in detail in the University of Oklahoma Health Sciences Center Institutional Assurance, dated August 1, 1984, under Section II, A.5. (Supplements); Section II, A.14. (Changes in the research); and Section II, D.6. (Continuing review).

Finally, we urge you to review your professional liability insurance to make sure your coverage includes the activities in this study.

Sincerely,

Fletcher B. Taylor, Jr., M.D.
Chairman, Institutional Review Board

FBT:dlk

83

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE   Veterans Administration Medical Center

GRANTS TO   Anna Ferguson, R.N., M.S.
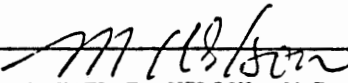
a student enrolled in a program of nursing leading to a Doctoral Degree at
Texas Woman's University, the privilege of its facilities in order to study
the following problem.

Identification of Stressful Event Mediators of Pain in the
Cardiac Patient
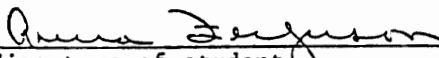
The conditions mutually agreed upon are as follows:
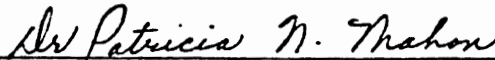
1.   The agency (may) (may not) be identified in the final report.

2.   The names of consultative or administrative personnel in the
      agency (may) (may not) be identified in the final report.

3.   The agency (wants) (does not want) a conference with the student
      when the report is completed. A report of the results from this study
      should be provided to the VAMC Nursing Service and Research Service.

4.   The agency is (willing) (unwilling) to allow the completed report
      to be circulated through interlibrary loan.

5.   Other _____

_____

_____

Date: _____   MICHAEL F. WILSON, M.D., Associate Chief of
                             Signature of Agency Personnel for Research
                             Oklahoma City OK VA Medical Center

_____   _____
Signature of student   Signature of Faculty Advisor

* Fill out & sign three copies to be distributed as follows:
  Original – Student: First Copy – Agency; Second copy – TWU College
  of Nursing.

84

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE _PACER Fitness Center_

GRANTS TO __Anna Ferguson, R.N., M.S.__

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

Identification of Stressful Event Mediators of Pain in the
Cardiac Patient

The conditions mutually agreed upon are as follows:

1. The agency (may) (may not) be identified in the final report.

2. The names of consultative or administrative personnel in the
agency (may) (may not) be identified in the final report.

3. The agency (wants) (does not want) a conference with the student
when the report is completed.

4. The agency is (willing) (unwilling) to allow the completed report
to be circulated through interlibrary loan.

5. Other _____

_____

Date: ___10/9/__   _____
                   Signature of Agency Personnel

_____   _____
Signature of student   Signature of Faculty Advisor

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

LETTER TO SUBJECTS

Dear _____,

I am conducting a study at Texas Woman's University, Denton, Texas, to investigate the relationship between events occurring in the daily lives of persons with heart disease and their episodes of chest pain. Some of the events listed happen to most people at one time or another while some of the other events happen to only a few people.

Your doctor has given permission to contact you and request your participation in the study. There will be no effect on your medical or nursing care if you choose not to participate. There are no risks to you if you do participate and the information learned may ultimately be helpful to persons with heart disease.

Records will be kept confidential and will be used solely for the purpose of this study. Information will be coded and filed under lock to insure privacy for all participants. No one will be individually identifiable in the final report. All information will be destroyed after completion of the study.

If you will participate in the study, please fill out the Demographic Data Sheet, the three questionnaires, and mark the Frequency of Anginal Pain Checklist according to the directions given and return all of the forms to me in the enclosed, addressed and stamped envelope. Returning the forms to me constitutes your consent and voluntary participation in this study. It is estimated that completion of the questionnaires will require about thirty minutes of your time.

If you desire additional information about the study, please contact me, Anna Ferguson, at 405/454-3188, or Dr. Patricia Mahon, Texas Woman's University, 817/383-1641. If you have questions about your rights as a research subject, you may call the Director of Research Administration, University of Oklahoma Health Sciences Center, 405/271-2090, or contact the Human Subjects Review Committee, Texas Woman's University, Box 22393, Denton, TX 76204.

Thank you for your time and cooperation.

Anna Ferguson, R.N., M.S.   Patricia Mahon, Ph.D.
813 North Luther Road   Texas Woman's University
Harrah, OK 73045   Denton, TX 76204
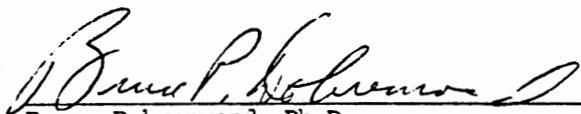
To Whom it May Concern:

Permission is given to Anna Ferguson to use the Psychiatric Epidemiology Research Interview Life Events Scale as a tool to study stressful event mediators of pain in the cardiac patient.
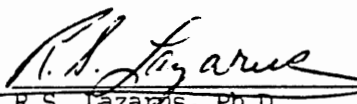
5-30-85
Date

Bruce Dohrenwend, Ph.D.
Director, Social Psychiatry Research Unit
Columbia University
New York, N.Y. 10032

To Whom it May Concern:

Permission is given to Anna Ferguson to use the Hassles and uplifts scales as a tool to study stressful event mediators of pain in the cardiac patient.

May 30, 1985
_____
Date

_____
R.S. Lazarus, Ph.D.
Department of Psychology
University of California
Berkeley, California

88

DEMOGRAPHIC DATA

RETURN OF THIS QUESTIONNAIRE WILL BE CONSIDERED TO BE YOUR CONSENT TO BE A RESEARCH SUBJECT IN THIS STUDY.

Please answer the following:

Birthdate

	Month	Day	Year

Race   Caucasian _____
            Black   _____
            Indian   _____
            Other   _____
                        (specify)

Marital status   Married   _____
                 Never married _____
                 Widower   _____
                 Divorced   _____

Employment   Full-time   _____
             Part-time   _____
             Retired   _____
             Sick leave _____

Education   Years of school completed _____

How often have you experienced chest pain during the past year?

                 5 or more times per week   _____
                 1-4 times per week   _____
                 3 or less times per month _____

THE HASSLES SCALE

<u>RETURN OF THIS QUESTIONNAIRE WILL BE CONSIDERED TO BE YOUR CONSENT TO BE A RESEARCH SUBJECT IN THIS STUDY.</u>

<u>Directions</u>: Hassles are irritants that can range from minor annoyances to fairly major pressures, problems, or difficulties. They can occur few or many times.

Listed in the center of the following pages are a number of ways in which a person can feel hassled. First, circle the hassles that have happened to you <u>in the past 24 hours</u>. Then look at the numbers on the right of the items you circled. Indicate by circling a 1, 2, or 3 how SEVERE each of the <u>circled</u> hassles has been for you in the past 24 hours. If a hassle did not occur in the past 24 hours, do NOT circle it.

SEVERITY
1. Somewhat severe
2. Moderately severe
3. Extremely severe

HASSLES

1.	Misplacing or losing things	1	2	3
2.	Troublesome neighbors	1	2	3
3.	Social obligations	1	2	3
4.	Inconsiderate smokers	1	2	3
5.	Troubling thoughts about your future	1	2	3
6.	Thoughts about death	1	2	3
7.	Health of a family member	1	2	3
8.	Not enough money for clothing	1	2	3
9.	Not enough money for housing	1	2	3
10.	Concerns about owing money	1	2	3
11.	Concerns about getting credit	1	2	3
12.	Concerns about money for emergencies	1	2	3
13.	Someone owes you money	1	2	3
14.	Financial responsibility for someone who doesn't live with you	1	2	3
15.	Cutting down on electricity, water, etc.	1	2	3
16.	Smoking too much	1	2	3
17.	Use of alcohol	1	2	3
18.	Personal use of drugs	1	2	3
19.	Too many responsibilities	1	2	3
20.	Decisions about having children	1	2	3
21.	Non-family members living in your house	1	2	3
22.	Care for pet	1	2	3
23.	Planning meals	1	2	3
24.	Concerned about the meaning of life	1	2	3

SEVERITY
1. Somewhat severe
2. Moderately severe
3. Extremely severe

25.	Trouble relaxing	1	2	3
26.	Trouble making decisions	1	2	3
27.	Problems getting along with fellow workers	1	2	3
28.	Customers or clients give you a hard time	1	2	3
29.	Home maintenance (inside)	1	2	3
30.	Concerns about job security	1	2	3
31.	Concerns about retirement	1	2	3
32.	Laid-off or out of work	1	2	3
33.	Don't like current work duties	1	2	3
34.	Don't like fellow workers	1	2	3
35.	Not enough money for basic necessities	1	2	3
36.	Not enough money for food	1	2	3
37.	Too many interruptions	1	2	3
38.	Unexpected company	1	2	3
39.	Too much time on hands	1	2	3
40.	Having to wait	1	2	3
41.	Concerns about accidents	1	2	3
42.	Being lonely	1	2	3
43.	Not enough money for health care	1	2	3
44.	Fear of confrontation	1	2	3
45.	Financial security	1	2	3
46.	Silly practical mistakes	1	2	3
47.	Inability to express yourself	1	2	3
48.	Physical illness	1	2	3
49.	Side effects of medication	1	2	3
50.	Concerns about medical treatment	1	2	3
51.	Physical appearance	1	2	3
52.	Fear of rejection	1	2	3
53.	Difficulties with getting pregnant	1	2	3
54.	Sexual problems that result from physical problems	1	2	3
55.	Sexual problems other than those resulting from physical problems	1	2	3
56.	Concerns about health in general	1	2	3
57.	Not seeing enough people	1	2	3
58.	Friends or relatives too far away	1	2	3
59.	Preparing meals	1	2	3
60.	Wasting time	1	2	3
61.	Auto maintenance	1	2	3
62.	Filling out forms	1	2	3
63.	Neighborhood deterioration	1	2	3
64.	Financing children's education	1	2	3
65.	Problems with employees	1	2	3
66.	Problems on job due to being a woman or man	1	2	3
67.	Declining physical abilities	1	2	3
68.	Being exploited	1	2	3

SEVERITY
1. Somewhat severe
2. Moderately severe
3. Extremely severe

69.	Concerns about bodily functions	1	2	3
70.	Rising prices of common goods	1	2	3
71.	Not getting enough rest	1	2	3
72.	Not getting enough sleep	1	2	3
73.	Problems with aging parents	1	2	3
74.	Problems with your children	1	2	3
75.	Problems with persons younger than yourself	1	2	3
76.	Problems with your lover	1	2	3
77.	Difficulties seeing or hearing	1	2	3
78.	Overloaded with family responsibilities	1	2	3
79.	Too many things to do	1	2	3
80.	Unchallenging work	1	2	3
81.	Concerns about meeting high standards	1	2	3
82.	Financial dealings with friends or acquaintances	1	2	3
83.	Job dissatisfactions	1	2	3
84.	Worries about decisions to change jobs	1	2	3
85.	Trouble with reading, writing, or spelling abilities	1	2	3
86.	Too many meetings	1	2	3
87.	Problems with divorce or separation	1	2	3
88.	Trouble with arithmetic skills	1	2	3
89.	Gossip	1	2	3
90.	Legal problems	1	2	3
91.	Concerns about weight	1	2	3
92.	Not enough time to do the things you need to do	1	2	3
93.	Television	1	2	3
94.	Not enough personal energy	1	2	3
95.	Concerns about inner conflicts	1	2	3
96.	Feel conflicted over what to do	1	2	3
97.	Regrets over past decisions	1	2	3
98.	Menstrual (period) problems	1	2	3
99.	The weather	1	2	3
100.	Nightmares	1	2	3
101.	Concerns about getting ahead	1	2	3
102.	Hassles from boss or supervisor	1	2	3
103.	Difficulties with friends	1	2	3
104.	Not enough time for family	1	2	3
105.	Transportation problems	1	2	3
106.	Not enough money for transportation	1	2	3
107.	Not enough money for entertainment and recreation	1	2	3
108.	Shopping	1	2	3
109.	Prejudice and discrimination from others	1	2	3
110.	Property, investments or taxes	1	2	3

SEVERITY
1. Somewhat severe
2. Moderately severe
3. Extremely severe

111.	Not enough time for entertainment and recreation	1	2	3
112.	Yardwork or outside home maintenance	1	2	3
113.	Concerns about news events	1	2	3
114.	Noise	1	2	3
115.	Crime	1	2	3
116.	Traffic	1	2	3
117.	Pollution	1	2	3

HAVE WE MISSED ANY OF YOUR HASSLES? IF SO, WRITE THEM IN BELOW:

118. _____   1   2   3

ONE MORE THING: HAS THERE BEEN A CHANGE IN YOUR LIFE THAT AFFECTED HOW
YOU ANSWERED THIS SCALE? IF SO, TELL ME WHAT IT WAS:

THE UPLIFTS SCALE

RETURN OF THIS QUESTIONNAIRE WILL BE CONSIDERED TO BE YOUR CONSENT TO BE A RESEARCH SUBJECT IN THIS STUDY.

Directions: Uplifts are events that make you feel good. They can be sources of peace, satisfaction, or joy. Some occur often, others are relatively rare.

On the following pages, circle the events that have made you feel good in the past 24 hours. Then look at the numbers on the right of the items you circled. Indicate by circling a 1, 2, or 3 how OFTEN each of the circled uplifts has occurred in the past 24 hours. If an uplift did not occur in the past 24 hours, do NOT circle it.

HOW OFTEN
1. Somewhat often
2. Moderately often
3. Extremely often

UPLIFTS

1.	Getting enough sleep	1	2	3
2.	Practicing your hobby	1	2	3
3.	Being lucky	1	2	3
4.	Saving money	1	2	3
5.	Nature	1	2	3
6.	Liking fellow workers	1	2	3
7.	Not working (on vacation, laid-off, etc.)	1	2	3
8.	Gossiping; "shooting the bull"	1	2	3
9.	Successful financial dealings	1	2	3
10.	Being rested	1	2	3
11.	Feeling healthy	1	2	3
12.	Finding something presumed lost	1	2	3
13.	Recovering from illness	1	2	3
14.	Staying or getting in good physical shape	1	2	3
15.	Being with children	1	2	3
16.	"Pulling something off"; getting away with something	1	2	3
17.	Visiting, phoning, or writing someone	1	2	3
18.	Relating well with your spouse or lover	1	2	3
19.	Completing a task	1	2	3
20.	Giving a compliment	1	2	3
21.	Meeting family responsibilities	1	2	3
22.	Relating well with friends	1	2	3
23.	Being efficient	1	2	3
24.	Meeting your responsibilities	1	2	3
25.	Quitting or cutting down on alcohol	1	2	3
26.	Quitting or cutting down on smoking	1	2	3

HOW OFTEN
1. Somewhat often
2. Moderately often
3. Extremely often

27.	Solving an ongoing practical problem	1	2	3
28.	Daydreaming	1	2	3
29.	Weight	1	2	3
30.	Financially supporting someone who doesn't live with you	1	2	3
31.	Sex	1	2	3
32.	Friendly neighbors	1	2	3
33.	Having enough time to do what you want	1	2	3
34.	Divorce or separation	1	2	3
35.	Eating out	1	2	3
36.	Having enough (personal) energy	1	2	3
37.	Resolving inner conflicts	1	2	3
38.	Being with older people	1	2	3
39.	Finding no prejudice or discrimination when you expect it	1	2	3
40.	Cooking	1	2	3
41.	Capitalizing on an unexpected opportunity	1	2	3
42.	Using drugs or alcohol	1	2	3
43.	Life being meaningful	1	2	3
44.	Being well-prepared	1	2	3
45.	Eating	1	2	3
46.	Relaxing	1	2	3
47.	Having the "right" amount of things to do	1	2	3
48.	Being visited, phoned, or sent a letter	1	2	3
49.	The weather	1	2	3
50.	Thinking about the future	1	2	3
51.	Spending time with family	1	2	3
52.	Home (inside) pleasing to you	1	2	3
53.	Being with younger people	1	2	3
54.	Buying things for the house	1	2	3
55.	Reading	1	2	3
56.	Shopping	1	2	3
57.	Smoking	1	2	3
58.	Buying clothes	1	2	3
59.	Giving a present	1	2	3
60.	Getting a present	1	2	3
61.	Becoming pregnant or contributing thereto	1	2	3
62.	Having enough money for health care	1	2	3
63.	Traveling or commuting	1	2	3
64.	Doing yardwork or outside housework	1	2	3
65.	Having enough money for transportation	1	2	3
66.	Health of a family member improving	1	2	3
67.	Resolving conflicts over what to do	1	2	3
68.	Thinking about health	1	2	3
69.	Being a "good" listener	1	2	3

HOW OFTEN
1. Somewhat often
2. Moderately often
3. Extremely often

70.	Socializing (parties, being with friends, etc.)	1	2	3
71.	Making a friend	1	2	3
72.	Sharing something	1	2	3
73.	Having someone listen to you	1	2	3
74.	Your yard or outside of house is pleasing	1	2	3
75.	Looking forward to retirement	1	2	3
76.	Having enough money for entertainment and recreation	1	2	3
77.	Entertainment (movies, concerts, TV, etc.)	1	2	3
78.	Good news on local or world level	1	2	3
79.	Getting good advice	1	2	3
80.	Recreation (sports, games, hiking, etc.)	1	2	3
81.	Paying off debts	1	2	3
82.	Using skills well at work	1	2	3
83.	Past decisions "panning out"	1	2	3
84.	Growing as a person	1	2	3
85.	Being complimented	1	2	3
86.	Having good ideas at work	1	2	3
87.	Improving or gaining new skills	1	2	3
88.	Job satisfying despite discrimination due to your sex	1	2	3
89.	Free time	1	2	3
90.	Expressing yourself well	1	2	3
91.	Laughing	1	2	3
92.	Vacationing without spouse or children	1	2	3
93.	Liking work duties	1	2	3
94.	Having good credit	1	2	3
95.	Music	1	2	3
96.	Getting unexpected money	1	2	3
97.	Changing jobs	1	2	3
98.	Dreaming	1	2	3
99.	Having fun	1	2	3
100.	Going someplace that's different123			
101.	Deciding to have children123			
102.	Enjoying non-family members living in your house	1	2	3
103.	Pets	1	2	3
104.	Car working/running well123			
105.	Neighborhood improving	1	2	3
106.	Children's accomplishments	1	2	3
107.	Things going well with employee(s)	1	2	3
108.	Pleasant smells	1	2	3
109.	Getting love	1	2	3

HOW OFTEN
1. Somewhat often
2. Moderately often
3. Extremely often

		1	2	3
110.	Successfully avoiding or dealing with bureaucracy or institutions	1	2	3
111.	Making decisions	1	2	3
112.	Thinking about the past	1	2	3
113.	Giving good advice	1	2	3
114.	Praying	1	2	3
115.	Meditating	1	2	3
116.	Fresh air	1	2	3
117.	Confronting someone or something	1	2	3
118.	Being accepted	1	2	3
119.	Giving love	1	2	3
120.	Boss pleased with your work	1	2	3
121.	Being alone	1	2	3
122.	Feeling safe	1	2	3
123.	Working well with fellow workers	1	2	3
124.	Knowing your job is secure	1	2	3
125.	Feeling safe in your neighborhood	1	2	3
126.	Doing volunteer work	1	2	3
127.	Contributing to a charity	1	2	3
128.	Learning something	1	2	3
129.	Being "one" with the world	1	2	3
130.	Fixing/repairing something (besides at your job)	1	2	3
131.	Making something (besides at your job)	1	2	3
132.	Exercising	1	2	3
133.	Meeting a challenge	1	2	3
134.	Hugging and/or kissing	1	2	3
135.	Flirting	1	2	3

HAVE WE MISSED ANY OF YOUR UPLIFTS? IF SO, WRITE THEM IN BELOW:

136. _____   1   2   3

ONE MORE THING: HAS THERE BEEN A CHANGE IN YOUR LIFE THAT AFFECTED HOW YOU ANSWERED THIS SCALE? IF SO, TELL ME WHAT IT WAS:

PERI LIFE EVENTS SCALE

RETURN OF THIS QUESTIONNAIRE WILL BE CONSIDERED TO BE YOUR CONSENT TO BE A RESEARCH SUBJECT IN THIS STUDY.

Directions: Listed on the following pages are life events that may happen to anyone. First, circle the events that have happened to you in the past year (September 1, 1984 to September 1, 1985).

Then, indicate whether the event was DESIRABLE or UNDESIRABLE by circling the correct word.

If an event did not occur in the past year, do NOT circle it.

TOPIC AREA AND EVENT	DESIRABLE	UNDESIRABLE
Work		
1. Started work for the first time	DESIRABLE	UNDESIRABLE
2. Returned to work after not working for a long time	DESIRABLE	UNDESIRABLE
3. Changed jobs for a better one	DESIRABLE	UNDESIRABLE
4. Changed jobs for a worse one	DESIRABLE	UNDESIRABLE
5. Changed jobs for one that was no better or worse than the last one	DESIRABLE	UNDESIRABLE
6. Had trouble with a boss	DESIRABLE	UNDESIRABLE
7. Demoted at work	DESIRABLE	UNDESIRABLE
8. Found out that was not going to be promoted at work	DESIRABLE	UNDESIRABLE
9. Conditions at work got worse, other than demotion or trouble with boss	DESIRABLE	UNDESIRABLE
10. Promoted	DESIRABLE	UNDESIRABLE
11. Had significant success at work	DESIRABLE	UNDESIRABLE
12. Conditions at work improved, not counting promotion or other personal successes	DESIRABLE	UNDESIRABLE
13. Laid off	DESIRABLE	UNDESIRABLE
14. Fired	DESIRABLE	UNDESIRABLE
15. Started a business or profession	DESIRABLE	UNDESIRABLE
16. Expanded business or professional practice	DESIRABLE	UNDESIRABLE
17. Took on a greatly increased work load	DESIRABLE	UNDESIRABLE
18. Suffered a business loss or failure	DESIRABLE	UNDESIRABLE
19. Sharply reduced work load	DESIRABLE	UNDESIRABLE
20. Retired	DESIRABLE	UNDESIRABLE
21. Stopped working, not retirement, for an extended period	DESIRABLE	UNDESIRABLE
22. Retired	DESIRABLE	UNDESIRABLE

TOPIC AREA AND EVENT	DESIRABLE	UNDESIRABLE
Love and Marriage		
23. Became engaged	DESIRABLE	UNDESIRABLE
24. Engagement was broken	DESIRABLE	UNDESIRABLE
25. Married	DESIRABLE	UNDESIRABLE
26. Started a love affair	DESIRABLE	UNDESIRABLE
27. Relations with spouse changed for the worse, without separation or divorce	DESIRABLE	UNDESIRABLE
28. Married couple separated	DESIRABLE	UNDESIRABLE
29. Divorce	DESIRABLE	UNDESIRABLE
30. Relations with spouse changed for the better	DESIRABLE	UNDESIRABLE
31. Married couple got together again after separation	DESIRABLE	UNDESIRABLE
32. Marital infidelity	DESIRABLE	UNDESIRABLE
33. Trouble with in-laws	DESIRABLE	UNDESIRABLE
34. Spouse died	DESIRABLE	UNDESIRABLE
Family		
35. New person moved into the household	DESIRABLE	UNDESIRABLE
36. Person moved out of the household	DESIRABLE	UNDESIRABLE
37. Someone stayed on in the household after he was expected to leave	DESIRABLE	UNDESIRABLE
38. Serious family argument other than with spouse	DESIRABLE	UNDESIRABLE
39. A change in the frequency of family get-togethers	DESIRABLE	UNDESIRABLE
40. Family member other than spouse or child dies	DESIRABLE	UNDESIRABLE
Residence		
41. Moved to a better residence or neighborhood	DESIRABLE	UNDESIRABLE
42. Moved to a worse residence or neighborhood	DESIRABLE	UNDESIRABLE
43. Moved to a residence or neighborhood no better or no worse than the last one	DESIRABLE	UNDESIRABLE
44. Unable to move after expecting to be able to move	DESIRABLE	UNDESIRABLE
45. Built a home or had one built	DESIRABLE	UNDESIRABLE
46. Remodeled a home	DESIRABLE	UNDESIRABLE
47. Lost a home through fire, flood or other disaster	DESIRABLE	UNDESIRABLE

TOPIC AREA AND EVENT	DESIRABLE	UNDESIRABLE

Crime and Legal Matters

48. Assaulted	DESIRABLE	UNDESIRABLE
49. Robbed	DESIRABLE	UNDESIRABLE
50. Accident in which there were no injuries	DESIRABLE	UNDESIRABLE
51. Involved in a law suit	DESIRABLE	UNDESIRABLE
52. Accused of something for which a person could be sent to jail	DESIRABLE	UNDESIRABLE
53. Lost driver's license	DESIRABLE	UNDESIRABLE
54. Took out a mortgage	DESIRABLE	UNDESIRABLE
55. Started buying a car, furniture or other large purchase on the installment plan	DESIRABLE	UNDESIRABLE

Finances

56. Foreclosure of a mortgage or loan	DESIRABLE	UNDESIRABLE
57. Repossession of a car, furniture or other items bought on the installment plan	DESIRABLE	UNDESIRABLE
58. Took a cut in wage or salary without a demotion	DESIRABLE	UNDESIRABLE
59. Suffered a financial loss or loss of property not related to work	DESIRABLE	UNDESIRABLE
60. Went on welfare	DESIRABLE	UNDESIRABLE
61. Went off welfare	DESIRABLE	UNDESIRABLE
62. Got a substantial increase in wage or salary without a promotion	DESIRABLE	UNDESIRABLE
63. Did not get an _expected_ wage or salary increase	DESIRABLE	UNDESIRABLE
64. Had financial improvement not related to work	DESIRABLE	UNDESIRABLE

Social Activities

65. Increased church or synagogue, club, neighborhood, or other organizational activities	DESIRABLE	UNDESIRABLE
66. Took a vacation	DESIRABLE	UNDESIRABLE
67. Was not able to take a _planned_ vacation	DESIRABLE	UNDESIRABLE
68. Took trip other than a vacation	DESIRABLE	UNDESIRABLE
69. Took up a new hobby, sport, craft, or recreational activity	DESIRABLE	UNDESIRABLE
70. Dropped a hobby, sport, craft, or recreational activity	DESIRABLE	UNDESIRABLE
71. Acquired a pet	DESIRABLE	UNDESIRABLE

TOPIC AREA AND EVENT	DESIRABLE	UNDESIRABLE

Social Activities (continued)

72.	Pet died	DESIRABLE	UNDESIRABLE
73.	Made new friends	DESIRABLE	UNDESIRABLE
74.	Broke up with a friend	DESIRABLE	UNDESIRABLE
75.	Close friend died	DESIRABLE	UNDESIRABLE

Health

76.	Physical health improved	DESIRABLE	UNDESIRABLE
77.	Physical health decreased	DESIRABLE	UNDESIRABLE
78.	Physical illness	DESIRABLE	UNDESIRABLE
79.	Had surgery	DESIRABLE	UNDESIRABLE
80.	Injury	DESIRABLE	UNDESIRABLE
81.	Unable to get treatment for an illness or injury	DESIRABLE	UNDESIRABLE

Was there an important change or changes in your life that wasn't mentioned? If so, please tell me what it was:

FREQUENCY OF ANGINAL PAIN CHECKLIST

RETURN OF THIS QUESTIONNAIRE WILL BE CONSIDERED TO BE YOUR CONSENT TO BE A RESEARCH SUBJECT IN THIS STUDY.

Date:_____

Directions: Please place one check (✓) for each episode of pain you experienced in the last 24 hours. (If more than 1 episode occurs in an hour, place as many   as necessary.)

Time

12 Midnight_____
  1 a.m._____
  2 a.m._____
  3 a.m._____
  4 a.m._____
  5 a.m._____
  6 a.m._____
  7 a.m._____
  8 a.m._____
  9 a.m._____
10 a.m._____
11 a.m._____
12 Noon_____
  1 p.m._____
  2 p.m._____
  3 p.m._____
  4 p.m._____
  5 p.m._____
  6 p.m._____
  7 p.m._____
  8 p.m._____
  9 p.m._____
10 p.m._____
11 p.m._____
12 Midnight_____