Nursing Diagnostic Pilot Study: Psychophysiologic Stress

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NURSING THEORISTS, researchers and practitioners embrace the goal of defining a scientific body of knowledge in and for nursing.[1-6] Until recently the reciprocal interdependence of the three aspects of scientific inquiry was not fully appreciated. The circular process of theory, research and practice and the way in which each contributes to the establishment of knowledge may be internalized through involvement in each of the component parts.

This current project is a report of a pilot study concerned primarily with nurses' systematic and logical organization of observable events. This may be called nursing diagnosis, since the ability to make a diagnosis and to prescribe actions is closely related to the organizing and labeling of the phenomena about which diag-

The authors thank Sharon Butler, R.N., M.S.N., Aeries M. Eberhart, R.N., M.S.N., Margaret Ann Isaacs-Skelton, R.N., M.S.N. and Patty P. Lillis, R.N., M.S.N. from the Medical College of Georgia School of Nursing for their assistance in the preparation of this article.

0161-9268/79/0021-0027$2.00

nostic and therapeutic judgments are made. Developing a classification of diagnoses is one approach to describing the domain of nursing by building first-level or factor-isolating theory.[7]

The definition of nursing is expected to result from the compilation of the efforts of many. Thus, it will represent "what is" rather than "what ought to be." Once a representative description is made, tested and disseminated to all practitioners, the problems of nursing education, communication, research and theory building may begin to be resolved.

The process of nursing diagnosis involves placing a patient in a diagnostic category for the purpose of identifying and directing nursing management. A diagnostic category has three parts, including: (1) the state of the patient, the problem or the category label, (2) the probable cause of the problem and (3) the signs and symptoms. Gordon has identified this system as the Problem-Etiology-Sign/Symptom (P-E-S) format.[8(p1299)]

The pilot study was directed toward assuming the responsibility for developing a typology of stress as observed in patients with acute illness. The diagnostic process was divided into three phases: (1) the conceptual phase, in which the theoretical framework was described, the concept of stress was analyzed, the etiologies of stress were identified and the signs and symptoms consistent with the stress response were determined; (2) the empirical or clinical phase, in which the process was tested; and (3) the interpretative phase, in which the process was analyzed, evaluated and validated.

THE CONCEPTUAL PHASE

A Description of the Theoretical Framework

The concept of stress is often defined, investigated and analyzed in terms of its physiologic or psychologic characteristics. This framework reflects Cartesian philosophy. It views the human being as divisible into body and mind. The framework has been beneficial to the growth of science, allowing the researcher to objectively investigate the human organism without confounding the data with variables related to the soul.[9] When Descartes defined the human being as divisible into two parts "as if" he were both a mind and a body, a prolonged confusion arose over the centuries until the "as ifness" of the body-mind duality was lost.

Getting rid of the old duality which separated the patient into disconnected compartments is a difficult task after the philosophy has dominated thinking for so long. Viewing the mind and body as operating on a continuum, however, reflects a holistic framework and allows the patient to be seen as a biopsychosocial unit. The interconnection of mind and body is reflected in changes of emotions and physiology. The psychophysiological association reflects that a change in the physiological state will be related to an appropriate change in the psychological state and likewise, a change in the psychological state will be related to an appropriate change in the physiological state. These interconnections are considered invariable.[10(p3)]

From this level of understanding, body-mind relatedness is a concrete idea. One can attempt to define it, teach it, practice it and measure it. When we begin to deal with the "spirit" of the body-mind-spirit, however, we encounter difficulty.

"Spirit" may be thought of in a number of diverse ways. To some nurses, the idea of spirit may suggest human virtues such as caring, love, empathy and understanding. Others may conceive of spirit as a quality of transcendence, of a guiding force or as something outside of the self and beyond the individual nurse or patient. To others, spirit may suggest purely mystical feeling. From this viewpoint, it defies words. It is ineffable. If one could describe the spirit, then it would not be the spirit. It is indefinable yet it is a vital life force profoundly felt by the individual. It is capable of affecting one's life and behavior.

As nursing begins the work of describing and explaining those things which nurses diagnose in patients, they must operate from a body-mind-spirit approach. The framework of holism directed the development of this study. It provided the basis for investigating the psychophysiologic aspects of stress which emphasize the oneness of an organism and convey the belief that the psychological being and the biologic being are not separate but function as a unit.

Analysis of the Concept of Stress

A review of the literature was necessary during this phase to provide the investigators with the knowledge necessary to conceptually analyze stress. Concept analysis allows one to clearly examine the phenomena under study and focuses attention on what must be described and analyzed.[2(p5)]

Because of the increasing interest and research in the area of stress, a variety of definitions and explanations have developed, resulting in confusion about the concept. Stress is defined by the physicist in terms of a "cohesive force or molecular resistance in a body opposing the action of applied external force."[11(p4)] This definition does not incorporate meaning for living systems. Sciences dealing with living beings, however, do not have a precise and universal definition of stress. The confusion is compounded further in the area of life sciences when the concept is divided between physiological and psychological stress as discussed earlier.

Selye had defined the concept of stress in physiologic terms as "the state manifested by a specific syndrome which consists of all the nonspecifically induced changes within a biologic system."[12(p54)] This definition implies that stress is found within living beings, that it has no particular cause and it is a state manifested by a syndrome.

A stressor is defined as that which produces stress. A stressor is an alarming

A stressor is an alarming stimulus which, in turn, causes the condition of systemic stress in which extensive areas of the body manifest changes from their normal resting state.

stimulus which, in turn, causes the condition of systemic stress in which extensive areas of the body manifest changes from their normal resting state.[12(p64)] In an attempt to deal with the stress, the body uses adaptive responses. These responses or defense mechanisms are reflected in alterations in the individual's thoughts, feelings, endocrine and autonomic processes.

Physiologically, the kidneys, adrenals, liver, blood vessels, heart, brain, nerves, thyroid, pituitary, connective tissue and white blood cells all play a part in the adaptive role when responding to stressors.[11,12]

From a psychological viewpoint, stress is a much more abstract concept. Thus it is difficult to measure, quantify and predict. Researchers use the affective response of anxiety as an index of psychological stress. Anxiety can be conceptualized as a response which is produced by a stressor. It can be defined as an unpleasant emotional state related to the subjectively associated quality of fear which is directed toward the future.[13(p48)] Anxiety is, in effect, a signal that some catastrophic conflict is threatening to break into consciousness. It is a diffuse apprehension, unspecific and vague. It is this very vagueness that makes anxiety such a terrifying experience. Acutely anxious patients feel themselves, their values and their entire backgrounds being threatened.[14]

Anxiety is a response to what *may* happen. The individual is anxious before the event, regardless of what it may be. Anxiety shows no cyclic pattern. It is a continuous, diffuse phenomenon which begins, stops and is finished.[15]

From the literature review, we conceptualized psychophysiological stress as a response which is caused by or related to the presence of a stimulus or stressor. The response is an adaptive mechanism which is reflected in both physiological manifestations and psychological alterations which are interrelated and connected. The diagnostic label of psychophysiological stress represents the first part of the diagnostic category using the P-E-S format.

Identification of the Etiologies of Stress

The second part of the diagnostic category used in the P-E-S format deals with the factors which cause or contribute to the patient's unhealthful response. A specific patient problem may have multiple causes or may exist under different conditions or situations.[8(p1298),16(p81)] The etiology of the problem will determine the treatment. Different causes will have different treatments.

The etiology or contributing factors identified in the assessment indicate what areas the nurse will plan to change. They direct nurses' attention to those things which are maintaining an undesirable patient response and can be independently managed and treated by nurses.

The next step in our nursing diagnostic experience was to determine the specific nature of the stressors producing the stress response. Before proceeding, however, it was necessary to identify a specific patient population, not only to observe the stress response but also to determine which stressors were in operation.

To fully evaluate the concept, researchers must find naturally occurring stressful

situations. The advantage of this method is that naturally occurring stressors may be quite intense and may be more powerful than those that could be ethically produced in a laboratory. The disadvantage of this procedure is related to the many variables confounding the situation which cannot be controlled.

Our study sample consisted of acutely ill patients admitted suddenly to the coronary care unit (CCU) with an admission diagnosis of acute myocardial infarction. This specific illness appears to have profound impact on the body-mind-spirit relationship.[17,18]

From our past and present clinical experience and information obtained from the literature, we began to identify and name stressors capable of producing the psychophysiological stress response in acutely ill patients hospitalized with the diagnosis of acute myocardial infarction. As we began our naming, it soon became apparent that the stressors were falling into discrete, although sometimes overlapping, categories. Shortly thereafter, the classifications of physiological, psychological, environmental and sociocultural stressors were defined.

Determination of Signs and Symptoms

For each clinical situation requiring classification, large numbers of patients are surveyed. All the pertinent clinical properties are noted as present or absent for each patient.[19(p178)] These properties are signs and symptoms. They are also termed assessment parameters or empirical referents. Parameters serve as guidelines in selecting what to observe to determine whether or not the pertinent characteristics are present. They direct the diagnostician's attention toward the signs, symptoms, behavior or condition of the patient that should be assessed to determine the validity of the diagnosis being considered.[20(p59)]

Characteristics, on the other hand, represent the limits of the parameter. They provide the criteria or the operational definition for each parameter which affirms the existence of the diagnosis.[20(p59)] Heart rate, for example, identifies a specific parameter associated with the nursing diagnosis of psychophysiological stress. The characteristics, which would define the limits of heart rate, might include a rate greater than 100 beats/minute. Dysrhythmias may represent the assessment parameter. The criterion of greater than 10 premature ventricular contractions per minute indicates the characteristics of the parameter.

Once a nursing diagnosis has been selected, significant parameters must be identified to complete the third part of the diagnostic category. To rule in or rule out the parameter, characteristics must be established as measurement devices. This process of inclusion or exclusion of parameters involves decision making and will lead toward the definition of clusters of parameters which form subsets of the diagnosis under study.

As we began to review the literature, we quickly realized that there were no comprehensive and systematic empirical referents which thoroughly described the parameters and characteristics of the psychophysiologic stress response. We proceeded by synthesizing the parameters

which were identified in various review and research articles related to stress.

When a physiological, psychological, environmental or sociocultural stressor is present, the sympathetic nervous system (SNS) releases norepinephrine. An increase in heart rate results as does an increase in atrial and ventricular contractility.[21,22] There is also an increase in myocardial oxygen consumption and a drop in coronary venous oxygen saturation resulting from coronary vasoconstriction. Peripheral vascular resistance is increased, raising the blood pressure. Vasoconstriction of most blood vessels—especially those of the abdominal viscera and extremities—occurs. Other SNS mechanisms include dilatation of the pupil, increased glucose release from the liver, excitation of mental activity and stimulation of adrenomedullary function.[11,13,14,21-23]

Sympathetic nervous system stimulation of the adrenal medulla in turn causes the release of large amounts of epinephrine and norepinephrine.[24] These hormones are carried to all areas of the body by way of the circulating blood system and have almost the same effect as the direct SNS stimulation except that they last ten times as long. The only significant difference results from the specific effects of epinephrine which include: (1) constriction of the arterioles, (2) augmentation of the rate and force of myocardial contraction, (3) dilatation of bronchioles, (4) increased serum glucose and (5) stimulation of adrenocorticotropic hormone (ACTH) which in turn stimulates the adrenal cortex.

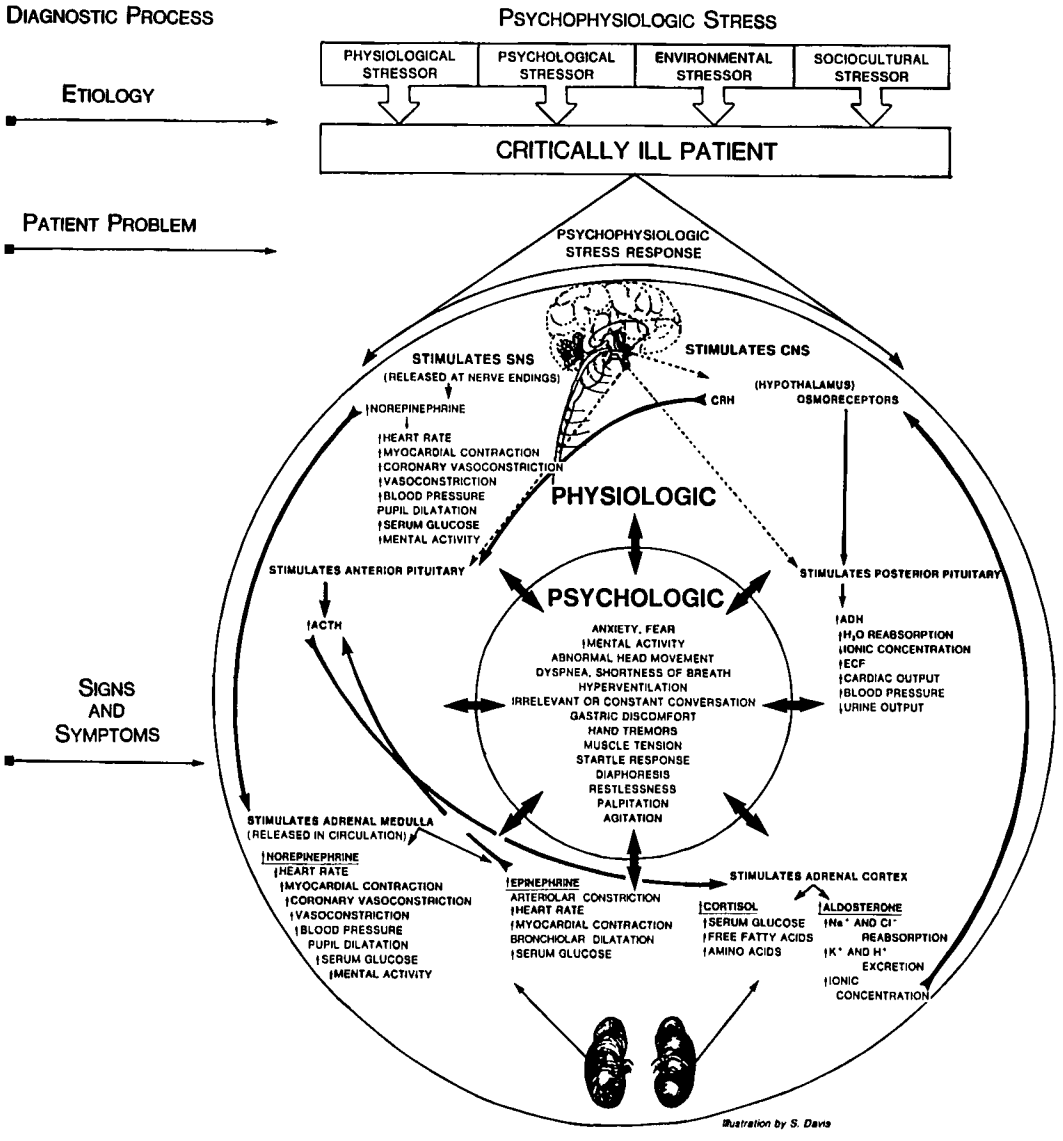
Under stress conditions, the hypothalamic-pituitary system is activated.[17,25,26] The hypothalamus releases corticotropin-releasing hormone (CRH) to the anterior pituitary, causing the release of ACTH. Adrenocorticotropic hormone in turn stimulates the receptor sites in the adrenal cortex to produce glucocorticoids (primarily cortisol) and mineralocorticoids (aldosterone). Cortisol stimulates gluconeogenesis and increases serum glucose levels. Amino acids and free fatty acids are mobilized and increased in the plasma concentration. Aldosterone, on the other hand, enhances the tubular reabsorption of sodium and chloride, which are exchanged for potassium and hydrogen ions excreted in the urine.

The rise in the serum electrolyte concentration of sodium and chloride further stimulates the osmoreceptors in the hypothalamus to increase their rate of neuronal discharge. These impulses are transmitted to the posterior pituitary gland to release antidiuretic hormone (ADH). Stimulation of ADH causes a marked reabsorption of water from the collecting and distal tubules, diluting the ionic concentration of the blood and increasing the extracellular fluid. An augmentation in cardiac output and arterial pressure is produced.[21] (See Figure 1.)

Neuroendocrine changes and sympathetic overactivity produce observable signs, symptoms and behaviors consistent with the psychophysiologic stress response.

Neuroendocrine changes—regulated by the central nervous system—and sympathetic overactivity—regulated by the au-

FIGURE 1. THE DIAGNOSTIC PROCESS IN PSYCHOPHYSIOLOGIC STRESS



Note: The conceptualization of stress is paralleled with the nursing diagnostic process using the P-E-S format.

tonomic nervous system—produce observable signs, symptoms and behaviors consistent with the psychophysiologic stress response. Patients may squirm, pace the floor or show signs of hand tremors. They may be observed to have tic-like head movements or show signs of restlessness, agitation or nonpurposeful activity.[13-15] Respirations may be rapid and deep and may be associated with an inability to get enough air. Additional parameters include diaphoresis, clenched fists, startle responses, expression of fears or anxiety, irrelevant conversation, rapid speech or constant conversation, loud or high-pitched speech, complaints, disinterest or strained faces.[11-14,23] Patients may further complain of palpitations, gastric discomfort, belching or an increase in defecation or micturition.[11,13]

After we had identified specific parameters obtained from the literature, we compared the parameters with scientific research investigations dealing with the psychophysiologic stress response. We attempted to discover which parameters were sensitive and clinically useful in measuring stress and to determine the characteristics or operational definitions of each.

Physiological parameters were systematically classified according to major body systems including cardiovascular, respiratory, gastrointestinal, renal and neuroendocrine systems. This type of classification provided an open method of organization which permitted the selection, inclusion or exclusion of parameters based on clinical utility and/or new investigative findings. (See Table 1.)

From the selected psychological responses identified in the literature, the investigators found that the majority of these parameters were contained within the Holland-Sgroi-Solkoff Anxiety-Depression Scale (A-D Scale).[27] The A-D Scale can be used to assess anxiety and depression and can be utilized in the psychological study of medically ill patients in general as well as of patients in intensive and coronary care.

Most scales available for measuring anxiety are lengthy. Thus, their use is not appropriate for acutely medically ill patients. The A-D Scale depends more upon the observation of the patient and less on the answering of lengthy questions. Validation and reliability studies have been successfully carried out on this scale.[28,29] Only the anxiety part of this instrument was used in the pilot study. (See Table 2.)

There are four possible answers to each question. The minimum obtainable score for anxiety is 15 while the maximum is 60. The range and mean of anxiety scores assessed in various patients using the A-D Scale are found in Table 3.

In an attempt to objectively define the psychophysiological stress response, operational definitions (characteristics) were derived for each parameter. The physiological characteristics for each parameter were identified and defined from the research related to stress and from the investigators' clinical experience. Because the operational definitions had already been defined for the A-D Scale, the investigators believed the criteria to be adequate.

TABLE 1
Selected Physiological Parameters and Characteristics of Stress

Physiological Parameters (P_x)		Characteristics (Ch_x)
A. Cardiovascular		
P_1 Heart rate	Ch_1	a rise of greater than 10 beats/minute over 3 observation periods
P_2 Heart sounds	Ch_2	abnormal S_1 or S_2; presence of S_3, S_4 or murmurs due to acute infarction
P_3 Dysrhythmias	Ch_3	PVCs, PJCs, PACs >5/min or in salvos, multifocal PVCs; exit block; arrest, asystole, heart blocks, bradydysrhythmias, tachydysrhythmias
P_4 ECG changes from initial insult	Ch_4	12-lead ECG changes of additional ischemia, injury or infarct
P_5 Blood pressure	Ch_5	a rise of systolic blood pressure greater than 10 mm Hg over 3 observation periods
B. Respiratory		
P_6 Respiratory rate	Ch_6	a rise of greater than 10/minute over 3 observation periods
P_7 Breath sounds	Ch_7	abnormal sounds suggestive of cardiac decompensation, defined as rales, wheezes, rhonchi
C. Gastrointestinal		
P_8 Nausea/vomiting	Ch_8	subjectively expressed symptom of nausea or documented observation of vomiting
P_9 Defecation	Ch_9	increase in number of BMs/day. Determine baseline number/day/week from history
P_{10} Bowel sounds	Ch_{10}	increase in peristaltic activity, listen to abdomen with stethoscope for 1 full minute and grade bowel sounds according to: 3+-hyperactive; 2+-normal; 1+-hypoactive; 0-none. If greater than 2+-abnormal
D. Genitourinary tract		
P_{11} Urinary output	Ch_{11}	rise in urinary output. Determine intake from output and allow 600cc for insensible loss. Check for sudden weight loss or hypernatremia due to excessive urinary output
P_{12} Urinary cortisol	Ch_{12}	24° urine specimen analyzed by competitive protein binding—radio-assay for unconjugated cortisol. Normal range—23-89 μg with an average of 48 μg/24 hours
E. Neuroendocrine		
P_{13} Herpes zoster/simplex	Ch_{13}	presence of fever blisters or shingles
P_{14} Temperature	Ch_{14}	temperature 1 degree above baseline
P_{15} Pupil size	Ch_{15}	observe pupils in normal, indirect lighting and grade

o o O O O O O O
2 3 4 5 6 7 8 9

If >5 = abnormal

TABLE 2
Selected Psychological Parameters and Characteristics of Stress

Psychological Parameters (P_x)		Characteristics (Ch_x)
A. Parameters from A-D Scale		
P_{16} Voluntary motor activity	Ch_{16}	1. normal and unaccompanied by tremors 2. normal but accompanied by fine tremulousness of hands 3. characterized by frank shaking of hands with abrupt jerky movements impairing attempted purposeful activity 4. grossly tremulous with inability to perform voluntary movements NOTE: no CNS disease apparent
P_{17} Voice pitch	Ch_{17}	1. within normal conversational limits 2. elevated at times during interview 3. frequently higher than normal throughout interview 4. persistently shrill
P_{18} General behavior	Ch_{18}	1. calm and composed 2. composed but mildly apprehensive and uneasy 3. distressed with moderate apprehension and fear 4. extremely frightened with loss of emotional control
P_{19} Muscle tone	Ch_{19}	1. relaxed appearance 2. characterized by a moderate amount of tension in muscles though lying still 3. characterized by generalized tension in muscles with tightening of muscles, fists and jaws 4. extreme tension; extremities held absolutely taut with no intervals of relaxation; head may be held off pillow
P_{20} Shortness of breath	Ch_{20}	1. none 2. occasional episodes of shortness of breath during interview 3. conversation interrupted by frequent shortness of breath 4. constant shortness of breath during interview NOTE: no medical basis
P_{21} Speech	Ch_{21}	1. spontaneous and appropriately conversational with examiner 2. verbose, giving lengthy answers 3. overtalkative without allowing examiner to conduct interview 4. constantly talking with disregard for examiner
P_{22} Volume level of speech (loudness)	Ch_{22}	1. compatible with conversational level 2. somewhat louder than usual conversational level 3. very much louder than usual conversational level 4. shouting throughout interview
P_{23} Expression of anxiety	Ch_{23}	1. no concern expressed 2. mild anxiety about condition with concern as to outcome 3. genuine fear as to outcome but emotional control retained

TABLE 2 (continued)

Psychological Parameters (P_x)		Characteristics (Ch_x)
P_{23} Expression of anxiety	Ch_{23}	4. panicked that might not survive
P_{24} Rate of speech	Ch_{24}	1. within normal limits 2. faster than normal speech but clear 3. accelerated sufficiently to make meaning unclear at times 4. so rapid that speech was largely unintelligible
P_{25} Motor activity (rate and amount)	Ch_{25}	1. within normal limits for physical condition 2. characterized by restless and fidgety movements 3. hyperactive with frequent changing of position and gross movements of arms and legs 4. characterized by ceaseless nonpurposeful activity of all extremities
P_{26} Reaction to surroundings	Ch_{26}	1. normal for physical condition 2. characterized by startle responses to ordinary noises (e.g., telephone, loud speaker, etc.) 3. characterized by startle responses accompanied by episodes of fear (excessive for stimulus) 4. frank panic reactions to a normal event in surroundings, e.g., pupils widely dilated, exaggerated sudden "jump" of whole body with temporary inability to continue conversation
P_{27} Increased respiration	Ch_{27}	1. no hyperventilation during interview 2. occasional episodes of hyperventilation during interview 3. frequent episodes of hyperventilation during interview 4. continuous hyperventilation throughout interview NOTE: without known medical basis
P_{28} Facial appearance	Ch_{28}	1. responsive with full range of appropriate expression 2. strained and tense 3. fearful and distressed 4. panicky with dilated pupils, widened palpebral fissures and tremulousness of mouth and jaws
P_{29} Diaphoresis	Ch_{29}	1. normal dry palms 2. moist cool palms 3. moist palms and beads of perspiration on face 4. beads of perspiration on face, neck and extremities and patches of perspiration on gown
P_{30} Sensation of tachycardia	Ch_{30}	1. no sensations of tachycardia or palpitations 2. occasional sensations of tachycardia or palpitations 3. frequent sensations of tachycardia or palpitations 4. constant sensations of tachycardia or palpitations NOTE: check #1 if there appears to be medical basis for these sensations

Source: Sgroi, S.M., Holland, J. C. B. and Solkoff, N. "Development of an Anxiety-Depression Scale for Use with Medically Ill Patients." Mimeograph. Department of Psychiatry, School of Medicine, State University of New York at Buffalo 1970.

TABLE 3
Range and Means of Anxiety Scores Using A-D Scale for Various Patients

	Anxiety Scores	
	Range	Mean
Normal	15-22	16.77
Intensive care	15-32	18.19
Medically ill	15-32	19.25
Psychiatric	22-41	27.27

EMPIRICAL PHASE

Objectives

Once we had gathered the essential information related to the patient's state or the psychophysiologic stress response, the etiology and the associated parameters and characteristics, we felt we were ready to pilot test the diagnostic process in the clinical setting. The purpose of the clinical phase was to develop a method of identifying the etiology, parameters and characteristics of stress. Hopefully, a useful clinical diagnostic classification system of the psychophysiologic stress response would be generated with the ultimate goal of determining and directing nursing intervention and management. Specifically, the objectives were to:

1. identify the nature of the stressors which may be present during hospitalization of the patient with an acute myocardial infarct;
2. assess the clinical utility and sensitivity of each of the psychophysiologic parameters reflective of the stress response;
3. determine the reliability and validity of the operational definitions (characteristics) for each parameter;
4. isolate clusters of parameters reflective of the stress response; and
5. derive a method of determining the level of the patient's psychophysiologic stress response based on the patient's total clinical picture.

Stressor/Parameter Assessment Sheet

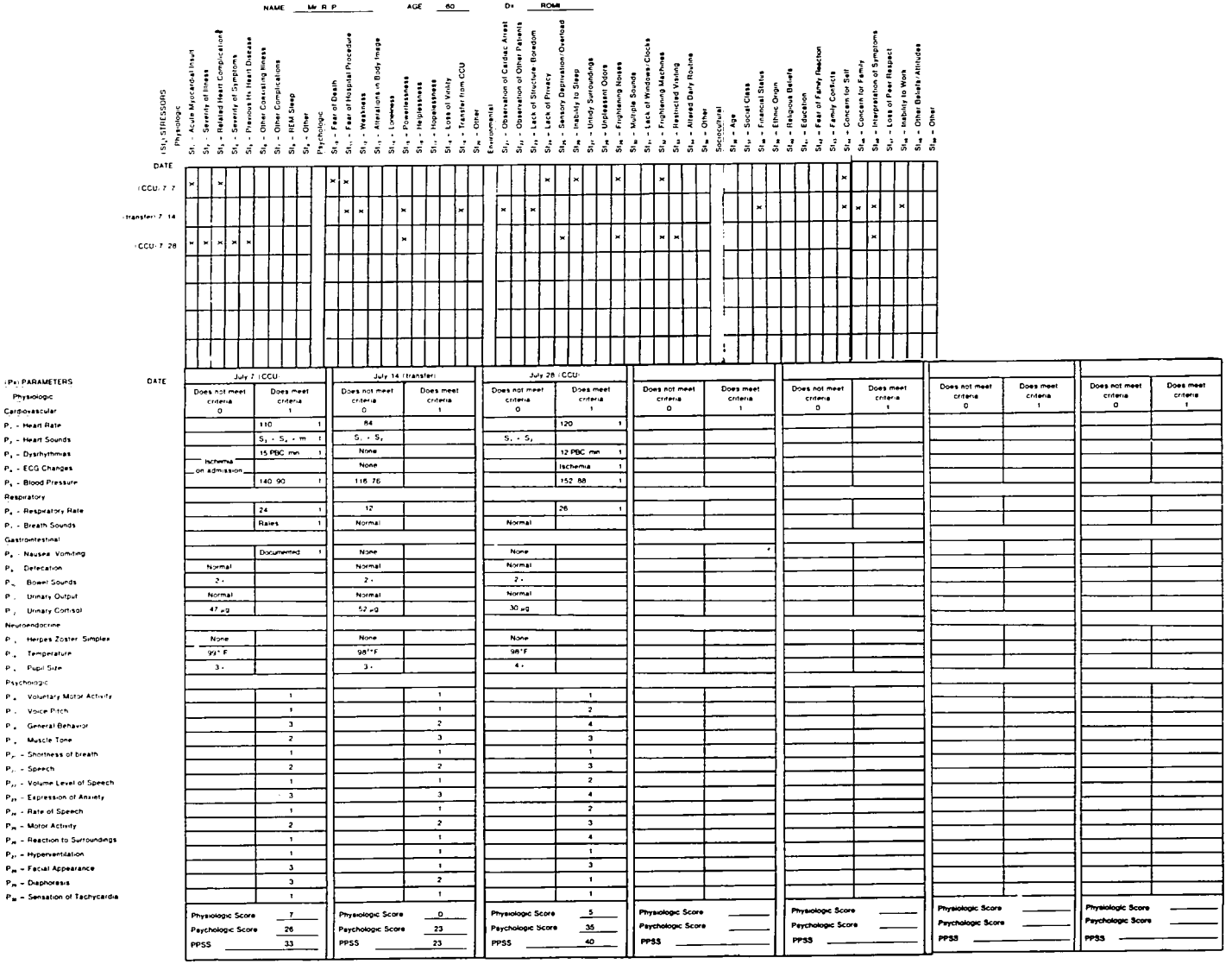
As a means of systematically assessing the psychophysiologic stress response in the clinical setting, a stressor/parameter (St_x/P_x) assessment sheet was created. (See Figure 2.) The sheet was designed to assess stress for each patient during several separate observational periods. It was used to identify operant stressors and to assess the absence or presence and degree of the parameters reflective of stress.

Both physiologic and psychologic parameters were used. If the patient's physiologic signs and symptoms did not meet the criteria operationalized for each parameter, the data were placed in the 0 column for the time segment. If the patient did exhibit physiologic signs and symptoms which fell within the limits of the criteria, the data were recorded on the left side of the box under column 1 and a corresponding score of 1 was assigned and placed at the right side of the box. All psychological parameters were similarly scored under column 1 and assigned a number from 1 to 4 as specified by the operational definitions of each parameter.

Methodology

Five patients admitted to the CCU with the presumptive diagnosis of acute myo-

FIGURE 2. SAMPLE STRESSOR/PARAMETER ASSESSMENT SHEET



cardial infarction were assessed and evaluated by the investigators in a large teaching hospital in the South. A data base was obtained for each patient using a biopsychosocial history and physical assessment. During each assessment period, the investigators attempted to identify the etiology of the manifest stress. They collected information from the patient, family, the patient's history, physical examination, chart and care plan as well as from the health team members to determine specific physiological, psychological, environmental or sociocultural stressors. During the same time period, the psychophysiologic parameters and characteristics of stress were assessed. Following the assessment period, all information was tabulated on the St_x/P_x assessment sheet and a physiologic and a psychologic score were determined.

This procedure was used for each patient admitted initially to the CCU, repeated for each patient shortly after transfer from the CCU to the floor, and repeated again shortly before discharge from the hospital.

Description of a Sample Subject

The assessment sheet of Mr. R. P. (Figure 2) illustrates the diagnostic methodology. Mr. R. P. was a 60-year-old married male admitted to the CCU with a two-hour history of substernal chest pain which radiated to the left arm and was associated with shortness of breath. He had complained of additional chest pain lasting for ten minutes and associated with nausea and vomiting 20 hours after admission. The patient had been in the CCU 24 hours prior to this assessment.

The patient was a high school graduate who worked five days a week as a custodian for the local school district. He had one daughter living at home and had been married for 20 years. He was 15 pounds overweight and had smoked one pack of cigarettes per day for 25 years. The patient had no previous history of heart disease. He had not previously taken any medications. His family history was noncontributory. This was the patient's first hospitalization.

Upon initial examination, the patient appeared alert, diaphoretic, anxious and in no acute distress. His apical heart rate was 110, respirations 24, blood pressure 140/90, temperature 99 F. He was found to have a third and fourth heart sound summation gallop, a II/VI systolic ejection murmur at the left sternal border, midclavicular line and bibasilar rales. His electrocardiogram revealed anterior ischemia and frequent premature ventricular contractions. His cardiac enzymes were slightly elevated.

During the assessment period, Mr. R.P. talked frequently of dying. He had requested and received the last rites the evening before. He stated he had been unable to sleep since admission and admitted that the cardiac monitor, intravenous (I.V.) line and CCU were frightening. All data were recorded on the St_x/P_x assessment sheet. (See Figure 2.) Mr. R. P. was found to have a physiologic score of 7 and a psychologic score of 26. The diagnosis of psychophysiologic stress was confirmed by the existence of the observed clinical manifestations and was related to the following stressors (St_x):

St_1 = acute myocardial insult;
St_3 = related heart complications;
St_{10} = fear of death;

St_{11} = fear of hospital routine;
St_{24} = lack of privacy;
St_{26} = inability to sleep;
St_{29} = frightening noises;
St_{32} = frightening machines; and
St_{44} = concern for self.

INTERPRETATIVE PHASE

Classification of Stress Levels

After the data had been tabulated for all patients, the classifications of low, moderate and high stress levels were defined. The investigators used the following classification system:

1. Low psychophysiological stress was identified when a score of 2 or less was derived from physiologic parameters and a score of 15 to 22 was obtained for the psychologic parameters;
2. Moderate psychophysiologic stress was identified when a score of 3 to 6 was obtained from the physiologic parameters and a score of 23 to 28 was obtained from the psychologic parameters; and
3. High psychophysiologic stress was identified when a score of greater than 6 was obtained from the physiologic parameters and a score of greater than 28 was obtained from the psychologic parameters.

When the investigators tried to apply this diagnostic classification system to the patients included in the study it did not work. As an example of our inability to apply this system, Mr. R. P., during his first assessment period, was found to have a physiological score of 7, placing him in the high category, while he had a psychologic score of 26, placing him in the moderate category as well.

In an attempt to solve this problem, it was decided to derive a total psychophysiologic stress score (PPSS) based on the summation of the physiologic and psychologic scores as follows:

1. low stress level identified by a PPSS of 15 to 24;
2. moderate stress level identified by a PPSS of 25 to 31; and
3. high stress level identified by a PPSS of greater than 31.

When applying this classification system to the data collected, it was discovered that three levels were not adequate to define the levels of observed stress. Mr. R. P., for example, had a total anxiety score of 33 during the first observation period, placing him in the high category. Three days prior to discharge (third assessment period) Mr. R. P. developed substernal chest pain lasting 30 minutes. His electrocardiogram revealed new ST segment elevation and *T* wave inversion in leads $V_{2\text{-}5}$. He was transferred back to the CCU. During this observational period, the CCU nurses stated the patient refused to follow the physician's orders related to restricted activities and bedrest. Matches were found under his pillow and the nurses had smelled smoke in the room. The patient told the investigators that he did not know why he was back in the CCU. He stated he felt great, denied the previous episode of chest pain and said, "I'm going to get my wife to get the doctor to let me go home. I'll climb out of the window if I have to." Mr. R. P. was assessed and was found to have a PPSS of 40. He was placed in the high category. Clinically, however, Mr. R. P. exhibited a higher level of stress at this

time than during his first observational period when he had a score of 33. However he was placed in the high category both times.

As a result, the investigators decided to add a fourth category of extreme anxiety to the other three levels. A new diagnostic classification evolved:

1. low stress level = 15 to 24 PPSS;
2. moderate stress level = 25 to 31 PPSS;
3. high stress level = 32 to 38 PPSS; and
4. extreme stress level = greater than 38 PPSS.

Results and Discussion

The results of the clinical project validated the existence of 31 out of 50 (60%) operant stressors in the patients assessed during three different observational periods. The primary stressors identified during the time segment in CCU were related most frequently to physiologic and environmental causes. The majority of stressors identified after transfer from the CCU and before discharge to home were associated with psychologic and sociocultural factors. There appeared to be an inverse relationship between the numbers of operant stressors and the length of hospitalization (except in the case of Mr. R. P.). Patients were found to have lower PPSS scores after transfer and before discharge than during their stay in the CCU.

The operational definitions for each physiologic parameter were validated and found to clinically measure the stress response. The choice of physiologic parameters, however, indicated that some were more substantive and sensitive than others to clinical measurement of the stress response. These included heart rate, dysrhythmias, blood pressure, respiratory rate, nausea/vomiting and pupil size. Defining the number of parameters to include only those which are useful would lead to a more efficient and effective assessment tool, saving both the patient and the diagnostician time and effort.

The A-D Scale appeared to be clinically useful in assessing and measuring psychological stress. When the physiologic score was added to the psychologic score to derive the PPSS, a workable and holistic diagnostic classification system evolved, allowing the categorization of low, moderate, high and extreme levels of psychophysiologic stress to be identified.

The levels of low, moderate, high and extreme psychophysiologic stress provide a diagnostic label which is clear and concise and sufficiently specific to be clinically useful. Additionally, the labels represent an operational level of abstraction reflecting an identifiable clinical entity which has value for directing appropriate nursing actions.

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The investigators did not observe clusters of signs and symptoms as previously anticipated when subjects were compared. Although the St_x/P_x assessment sheet was

not impressive based on the small number of patients studied, it was found to be a valuable tool for identifying and measuring psychophysiologic parameters as related to specific etiologic stressors based on a given observation time period. Moreover, the assessment sheet incorporated the potential for comparison and contrast of the stress responses over time and appeared to be adaptable to statistical analysis.

Once a diagnostic category is established, it will direct the plan of therapy. The next phase in this process, although not included in this project, would be to validate the effectiveness of nursing actions based on the outcomes of the patient's response.

Take for example, Mr. A. B., who was placed in the diagnostic category of high psychophysiologic stress based on the findings from the St_x/P_x assessment sheet. His PPSS score was found to be 36 and was related to three physiologic and two environmental stressors. His plan of care and nursing management would then be identified and implemented based on the etiology of his stress and the level of the response exhibited. If nursing interventions were effective in reducing the level of psychophysiologic stress, one would expect to see a reduction in the PPSS score, as well as the number of operant stressors. This process would be repeated for a large number of patients exhibiting various levels of stress related to various etiologies. Ultimately, the results will validate prescriptions for effective nursing actions which will control the outcomes of patient care.

RECOMMENDATIONS FOR FURTHER STUDY

It is recommended that the empirical phase of this project be replicated with a large sample of subjects. Operant stressors should continue to be identified, labeled and validated for patients with acute myocardial infarction, as well as those with other types of illness. Nursing actions capable of controlling, reducing, eliminating or preventing the stress response should be identified, implemented and evaluated. The direction of this work should be communicated, synthesized and collaborated with the efforts of the National Group for Classification of Nursing Diagnoses.

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