A STUDY OF THE STRESS OF ASSOCIATE DEGREE NURSING STUDENTS IN CLINICAL OPERATING ROOM EXPERIENCES

A THESIS

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CHAPTER I

INTRODUCTION

Orientation to the Study

In Future Shock, Toffler analyzed cultural and technological innovations in our rapidly changing society, many of which have increased the pace of daily living to such an extent that many people of our society appear to have a "sense of bewilderment and anxiety which is disruptive and uncomfortable."[1] Toffler goes on to say that "to survive, the individual must become infinitely more adaptable than ever before in order to cope with the stress of daily living."[2] Toffler based much of his philosophy on the work of Selye, who opened new frontiers in biology, medicine, and psychiatry, with his stress theory.[3]

Stress, according to Selye, is the "state manifested by a specific syndrome which consists of all the non-specifically induced changes within a biologic system."[4]

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[1]Alvin Toffler, Future Shock (New York: Random House, Inc., 1970), p. 42.

[2]Ibid., p. 380.

[3]Ibid., p. 340.

[4]Hans Selye, The Stress of Life (New York: McGraw-Hill Book Company, 1956), p. 54.

Since a state can only be recognized by its manifestations, the state of stress must be described by a specific observable syndrome. Selye divided this syndrome into the following stages: (1) the alarm reaction or the mobilization of defensive forces, (2) the stage of resistance or adaptation to the stressor, and (3) the stage of exhaustion. The stage of exhaustion follows when the stressor is severe and prolonged. This syndrome can be demonstrated as a general or local syndrome. A general stress syndrome affects the whole body; a local stress syndrome influences several units within a body part.[1]

Selye further describes stress as the rate at which organisms live at any moment, implying that all living beings are constantly under stress. Factors which speed up the intensity of life cause a temporary increase in stress. Stress manifestations are not limited merely to observable damage, but also include the adaptive and protective measures that the living organism as a whole or in part mobilizes to combat the stressor.[2] This is exemplified by the fact that stress does not necessarily imply a morbid change.[3]

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[1] Ibid., p. 64.

[2] Ibid., p. 63.

[3] Ibid., p. 3.

According to Wolff, Masters, Saul, and Selye, hemodynamic changes productive of elevated arterial pressure, reduced renal blood flow and increased blood viscosity occur as part of an individual's adaptation to problems and challenges in his daily life. It appears that stressful life experiences are sufficiently prominent among stimuli elevating arterial pressure to warrant their serious consideration in the clinical management of patients with essential hypertension. The evidence of emotional restraint and the exterior calm often displayed by these patients make it necessary for the physician to exercise special diligence and skill in uncovering meaningful life experiences and the attitudes and reactions associated with them. Hypertensive patients often lose all evidence of hypertension under psychotherapy and appear to develop a more confident and relaxed approach to life.[1]

In one's adjustment to stress, the adaptive mechanisms of man within his environment operate through the agency of endocrine and autonomic nerve processes.[2] Since

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[1]Wolff, Stress and Disease, pp. 78-82; Arthur M. Masters, "Blood Pressure," Illustrated Medical and Health Encyclopedia, ed. by Morris Fishbein (New York: Rotary Graphic Press, Inc., 1963), p. 321; Leon J. Saul, Personality and the Behavior Disorders (New York: The Ronald Press Co., 1944), pp. 269-306; Selye, op. cit., p. 116.

[2]Rene Dubos, Man Adapting (New Haven: Yale University Press, 1965), pp. 30-31.

Cannon first called attention to the physiological aspects of these adaptive mechanisms, numerous studies in various disciplines have been completed.[1] For example, Selye wrote of studies on problems of the diseases of adaptation involving the kidney, heart and blood vessels and on inflammatory disease involvement.[2] Hinkle and Wolff in 1958 investigated ecologic relationships between illness, life experiences and the social environment.[3] Antel and Cumming reported on the effect of emotional stimulation on exercise heart rate.[4]

Physiological processes involving adrenal activity have received particular attention in research efforts since both physical and emotional stimulation increase the activity of the adrenal gland.[5] For example, Gellhorn (1945) and Arnold (1945) studied the role of adrenalin and the role of the sympathetic nervous system in relation to the emotion

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[1]Walter B. Cannon, "The Mechanism of Emotional Disturbance of Bodily Functions," The New England Journal of Medicine, CXCVIII (1928), 877-884.

[2]Selye, op. cit., pp. 129-170.

[3]L. E. Hinkle and Harold G. Wolff, "Ecologic Investigations of the Relationship Between Illness, Life Experiences and the Social Environment," Annals of Internal Medicine, XLIX (1958), 1373-1388.

[4]Jack Antel and Gordon R. Cumming, "Effect of Emotional Stimulation on Exercise Heart Rate," The Research Quarterly, XL (1969), 6-10.

[5]Dubos, op. cit., p. 30.

of fear.[1,2]

The action of the internal organs is coordinated with intellectual and emotional actions through the process of homeostasis since the body reacts to stimuli as an entity. A psychological equilibrium should result.[3]

Lazarus, Dees, and Osler have defined psychological stress as "an interaction of the individual's motivation, interests, and field situation."[4] These investigators pointed out the similarities of this concept of psychological stress to the physiological model of Selye. Basic to this concept is the theory that throughout life man is constantly reacting to forces from within (the self) and from without (the environment). At times these forces may reinforce each other and the individual has a sense of well-being and accomplishment, as in learning situations.[5] Basowitz and

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[1]E. Gellhorn, "Autonomic Regulations: Their Significance for Physiology, Psychology and Neuropsychiatry," Interscience, XXXVIII (1943), 120-129.

[2]M. M. Arnold, "Physiological Differentiation of Emotional States," Psychology Review, LII (1945), 35-48.

[3]Eleanor P. Bowen, Biology of Human Behavior (New York: Appleton-Century-Crofts, 1968), p. 95.

[4]Robert S. Lazarus, et al., "The Effects of Psychological Stress Upon Performance," Psychology Bulletin, XLIX (1962), 293-317.

[5]Hilda Taba, Curriculum Development (New York: Harcourt, Brace and World, Inc., 1962), p. 110.

his associates have indicated that allegedly "stressful situations" do not always produce discomforting responses in individuals. Sometimes such stimuli may be in conflict with one another resulting in tension within the individual. This tension may then serve as a stimulus leading toward the eventual relief of tension and restoration of a sense of well-being.[1]

Both physiological and psychological stresses may elicit many kinds of manifestations. Psychosomatic illness is based on the concept of bodily changes resulting from psychological stresses.[2] Biochemical manifestations include blood electrolyte changes, such as an increase in calcium, nitrogen, cholesterol,[3] glucose, and uric acid.[4] Blood fibrinolytic activity, blood coagulability and changes in eosinophiles[5] and leucocyte levels[6] are other physiological characteristics that may be altered by situations causing

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[1]Harrell Basowitz, et al., Anxiety and Stress (New York: McGraw-Hill Book Company, Inc., 1955), p. 7.

[2]Dubos, op. cit., p. 268.

[3]Ibid., p. 31.

[4]Katherine K. Gordon and Richard E. Gordon, "Birth Order Achievement and Blood Chemistry Levels Among College Nursing Students," Nursing Research, XVI (1967), 234-237.

[5]Dubos, op. cit., p. 31.

[6]Robert F. McDavid, "Effects of Intermittent Work on Postexercise Leucocytosis," The Research Quarterly, XXXVIII (1967), 213-217.

mental anguish or mild anxiety.

Psychophysiological methods of measuring stress include many complex techniques based on electrophysiological data, involving principles of electricity, magnetism, and electronics.[1] Venables and Martin report studies of the skin resistance and the role of the sweat glands, studies of the peripheral circulation, gastric motility, and muscular contractability. Electroencephalography, electrocardiography, and blood pressure measurement have been used in studies as indices of psychological stress.[2] Wolff writes that

> Any arrangement for experimental purposes introduces artifacts and allows only an approximation of the natural responses of the subject under study. The investigator must live with these limitations, which may be less restrictive when it has been possible to make measurements as, for example, blood pressure, pulse or electrocardiogram by telemetering or by some recording device as a subject goes about his daily activities. Any of these experimental measures show variability of body responses in the process of homeostasis because man has varying periods of intense activity and is subjected to many stresses and strains. Constant adjustments have to be made.[3]

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[1]Peter H. Venables and Irene Martin, A Manual of Psychophysiological Methods (New York: John Wiley and Sons, Inc., 1967), p. 3.

[2]Ibid., pp. 53-102, 103-134, 219-245.

[3]Harold G. Wolff, Stress and Disease (Springfield, Illinois: Charles C. Thomas Publishing Company, 1968), p. 14.

Stresses as fear, anxiety, and apprehension may influence the level of the blood pressure, particularly the level of the systolic pressure.[1] For example, while preparing for activity in sporting events, athletes experience accelerated heart action, causing the blood pressure to soar, driving the blood through the muscles.[2]

Jacobson, writing of clinical tension observed in his patients, reported that tension can be shown to influence blood pressure at any moment. When a patient is over-tense, the blood pressure tends to be elevated both in systolic and diastolic values. In patients responsive to slight stress levels, the blood pressure can rise as high as 200/100, yet subsequent follow-up of the values may be well within normal range.[3]

Many college students react to the stress of transition from the home to college; they react to the stress of learning difficulties and to anxiety during examinations at a time when more is often expected of them scholastically

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[1]Blas Moia, "The Range of Normal Blood Pressure," Cardiology, IV, ed. by Aldo A. Luisado (New York: The Blakiston Division, McGraw-Hill Book Company, Inc., 1959), p. 15.

[2]Dubos, op. cit., p. 65.

[3]Edmund Jacobson, Tension in Medicine (Springfield, Illinois: Charles C. Thomas Publishing Company, 1967), pp. 4-8.

than ever before.[1] Even when students know their subject matter, fear can cause them to experience acute anxiety during examinations.[2] When learning difficulties assume panic proportions, the origin of the problems is usually unresolved personal problems of long standing, emphasized by the difficulties of learning.[3]

Nursing education involves the development of a number of competencies. Achievement in the classroom is an integral part of developing several of these competencies. Other competencies are developed in the clinical area of the hospital including complex techniques of patient care. The extent to which these cognitive skills are developed in the classroom and the psychomotor skills are learned through laboratory experiences to a large degree indicate success in the nursing program. These two components of nursing education affect the "whole person" including both their physiological and psychological responses to stimuli.

Since psychic factors can lead to physiological responses as indicators of stress, the investigator studied

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[1]Howard S. Becker, Blanche Geer, Everett C. Hughes, Making the Grade (New York: John Wiley and Sons, 1968), p. 150.

[2]C. H. Hardin Branch, Aspects of Anxiety (Philadelphia: J. B. Lippincott Company, 1968), p. 84.

[3]M. Robert Wilson, Jr., et al., "Underachievement in College Men: Evaluation of the Psychodynamics," Journal of Psychiatry, XXX (1967), 180-186.

the clinical nursing operating room experience as a stressor. The operating room experience of clinical nursing involved stress reaction at the cognitive level as well as in the area of physical performance. The operating room experience may be stressful to the student since from the nurse's viewpoint, surgery has five characteristics: (1) It is a psychological act, and the nurse must give psychological support to the patient. (2) It is a physiological act, and the nurse must be an adept clinician. (3) It is a social act, and the nurse must consider the patient's family and friends. (4) It is a legal act, and the nurse must be aware of legal rights and responsibilities. (5) It bears religious connotations which the nurse must seriously consider.[1] The impact upon the emotions of the student nurse may influence performance both positively or negatively at a time when competence is of the utmost importance.

There are several measures of stress on the cardiovascular system. For the purposes of this study, the systolic blood pressure measurement was employed by the investigator to determine stress reactions of nursing students in the clinical nursing operating room experiences. Blood pressure assessment is one of the most frequently measured and recorded quantitative observations made by

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[1]George LeMaitre and Janet Finnegan, The Patient in Surgery (Philadelphia: W. B. Saunders Company, 1965), p. 9.

nurses. Irregularities in blood pressure are often indicators of some abnormal condition in the body. Burch and DePasquale report that arterial blood pressure measurement ranks first in the many objective procedures physicians and nurses employ to obtain quantitative data on their patients.[1]

Statement of the Problem

The study entailed the relationships of stress to experiences in the operating room as part of the nursing education program. The stress was measured by the assessment of the systolic arterial blood pressure. Subjects chosen for this study were thirty-six sophomore woman students enrolled in the Associate Degree Nursing Program at Grayson County College, Denison, Texas, in the summer semester of 1971.

The clinical nursing operating room experiences involved all thirty-six students in a lecture-demonstration class at the college nursing laboratory. The objective of this phase of their program was to teach the nursing students to function within an aseptic setting, such as surgery. Experimental group one was composed of twelve students.

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[1]George E. Burch and Nicholas P. DePasquale, Primer of Clinical Measurement of Blood Pressure (St. Louis: The C. V. Mosby Company, 1962), p. 121.

This group had their systolic blood pressure assessments taken before, during, and after the lecture-demonstration class. The second experimental group also consisted of twelve students. This group had their systolic blood pressure assessments taken before, during, and after observing major surgery in the operating room. The third experimental group consisted of twelve students who had their systolic blood pressure assessments taken before, during, and after assisting the surgeons with major surgery.

Definitions and/or Explanation of Terms

For the purpose of clarification, the following explanations and/or definitions of terms were established for use in the proposed study:

Physiological Stress: The investigator accepted the following definition by Selye:

> Stress is the state manifested by a specific syndrome which consists of all the non-specifically induced changes within a biologic system.[1]

Arterial Blood Pressure: The investigator accepted the following definition by Gunn:

> The term "blood pressure" refers to the pressure of the blood on the wall of an artery. The arterial blood pressure is constantly changing during the course of the cardiac cycle. The highest pressure

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[1]Selye, op. cit., p. 54.

> in this cycle is the systolic blood pressure; the lowest is the diastolic blood pressure. A typical blood pressure is expressed thus: 120/80 mm. Hg.[1]

Associate Degree Nursing Program: Associate Degree Nursing was a result of the Cooperative Research Project in Junior and Community College Education for Nursing, under the direction of Dr. Mildred Montague of the Division of Nursing Education of Teachers College, Columbia University.[2] Montague stated that the premise on which the need for technical education in nursing rests is that nursing is an occupation with a professional and technical component. The two-year college facilitates this composite by providing courses in general education, and, in addition, those courses appropriate to the technical education of the nurse practitioner.[3] The Department of Associate Degree Programs of the National League for Nursing developed the following definition of a technical nurse:

> Technical nurse: A registered nurse with an associate degree in nursing licensed for the practice of nursing who carries out nursing and other therapeutic measures with a high degree of skill, using principles from an ever-expanding body of

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[1]Ira P. Gunn, "Blood Pressure Measurement as a Quantitative Research Criterion," Nursing Research, XV (Winter, 1966), 7.

[2]Ann N. Zeitz, et al., Associate Degree Nursing (St. Louis: The C. V. Mosby Company, 1969), p. 4.

[3]Mildred Montague, Community College Education for Nursing (New York: McGraw-Hill Book Company, 1959), p. 339.

> science. The technical nurse performs nursing functions with patients who are under the supervision of a physician and/or professional nurse and assists in planning the day-to-day care of patients, evaluating the patients' physical and emotional reactions to therapy, taking measures to alleviate distress, using treatment modalities with knowledge and precision, and supervising other workers in the technical aspects of care.[1]

Clinical Nursing Operating Room Experience: During the clinical and application of theory phase of the course Mental and Physical Health and Illness, designed to give insight into nursing the patient with a surgical problem, the nursing student is assigned to the operating room in the hospital. The student works with a professional nurse assisting the surgeon or surgeons at the operating table as a member of the operating team.

Purpose of the Study

The purpose of the study was to determine the physiological stress reaction from clinical nursing operating room experiences on the systolic blood pressure assessments of nursing students in an Associate Degree Nursing Program.

The hypothesis to be tested was: There is no significant difference between the systolic blood pressure

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[1]Department of Associate Degree Programs, National League for Nursing, Associate Degree Education for Nursing (New York: National League for Nursing, 1967), p. 4.

assessments of nursing students in the nursing lecture-demonstration class in preparation for the surgical assignment, observing a surgical operation and assisting the surgeon or surgeons at the operating table in the operating room.

Specific hypotheses included:

1. There is no significant difference between the systolic blood pressure assessments of subjects in all three experimental groups before all operating room experiences.

2. There is no significant difference between the systolic blood pressure assessments of subjects during all operating room experiences.

3. There is no significant difference between the systolic blood pressure assessments of subjects after all operating room experiences.

4. There is no significant difference between the systolic blood pressure assessments of subjects in experimental group one before, during, and after the lecture-demonstration class.

5. There is no significant difference between the systolic blood pressure assessments of subjects in experimental group two before, during, and after observing major surgery.

6. There is no significant difference between the systolic blood pressure assessments of subjects in

experimental group three before, during, and after assisting the surgeons at the operating table.

Delimitations of the Study

Because of the nature and design of the study, there were inherent delimitations to several phases of the study: (1) Subjects in the study were a selected group of nursing students. Thirty-six subjects were randomly selected from a class of fifty-six students after screening out subjects with extreme high and low systolic blood pressure assessments. Eliminating high and low assessments was done in order to be able to equate the systolic pressure assessments for experimental design purposes. (2) The study is limited as to accuracy of the recordings of the blood pressure assessments. (3) The results of the study will reflect only one aspect of the physiological response to stress. A systolic blood pressure increase is only a part of the complex stress syndrome. (4) There may be questionable validity in the selection of the learning experiences as a measure of the stress of nursing students. (5) Experimental variables are inherent in the experiences. Attempts to control these were made. All of the experiments were held at approximately the same time of day, under similar environmental conditions (the college nursing laboratory and the hospital operating suites). All students in the experiments were on the same

schedules for class and hospital assignments.

Summary

Basic to this study is the concept of the stress and General Adaptation Syndrome, as identified by Selye. He defined stress as

> . . . the state manifested by a specific syndrome which consists of all the non-specifically induced changes within a biologic system.[1]

There are varying degrees and different forms of stress: mental, emotional, and physical. All have some impact, sometimes beneficial, sometimes harmful, upon health. Stress can often be the innovating force of life, or, depending upon circumstances and individual capacities and reactions, it may have damaging side effects which may lead to disease, cause premature aging, or sometimes even shorten life.

The manifestations of stress have been explored in research studies for many years. Bodily symptoms and changes indicative of stress include primarily those in the circulatory system, nervous and endocrine systems; body electrolyte and hematological changes have frequently been observed.

The present study focused on the psychophysiological stress of the Associate Degree Nursing student in the learning situation of assisting the surgeons with major surgery.

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[1]Selye, op. cit., p. 54.

The degree of stress was measured by the systolic blood pressure assessments which were taken before, during, and after the operating room experiences. The study involved thirty-six nursing students at Grayson County College, Denison, Texas, in the summer semester of 1971.

All thirty-six nursing students participated in a lecture-demonstration class designed to simulate the surgical experience. Twelve of these students were included in experimental group one. Assessments for this group were taken before, during, and after the class. Twelve more students were included in experimental group two. They had their systolic blood pressure assessments taken before, during, and after observing major surgery in an operating room. Experimental group three consisted of twelve other students who had their systolic blood pressure assessments taken before, during, and after assisting the surgeons with major surgery.

The investigator studied the psychophysiological stress from the clinical nursing operating room experiences in order to evaluate the experience in terms of the educational objective for the assignment. The hypothesis to be tested was: There is no significant difference between the systolic blood pressure assessments of nursing students in the nursing lecture-demonstration class in preparation for the surgical assignment, observing a major surgical operation,

and assisting the surgeon or surgeons at the operating table.

The results of the study reflected only one phase of the physiological response to stress; blood pressure assessments reflect known variables. The study has limited external validity; the scope of interest is probably limited to instructors and nursing students.

The related literature which follows in Chapter II lent substantiality to this investigator's research design, rationale and procedures for the conduct of this study.

CHAPTER II

SURVEY OF RELATED LITERATURE

To the extent that the investigator was able to determine, this study does not duplicate any previous study. Literature relative to the study will be reviewed under the following center headings: Psychological Stress Related to Daily Living, Psychological Stress Related to Educational Learning Experiences, and Psychological Stress from Involvement with Illness.

Psychological Stress Related to Daily Living

Stevenson and Duncan studied alterations in cardiac function during periods of life stress. In the study, nineteen subjects displayed significant changes in tracings of the electrocardiogram when exercise was performed during a period of stress; blood pressure assessments also showed significant increases. The exercise on a day of relative security and relaxation produced less change in the electrocardiogram and blood pressure assessments, or none at all. In all but one of the nineteen subjects, it was possible to produce electrocardiographic and blood pressure changes during an interview covering pertinent problems and without

exercise or conscious anticipations of muscular effort.[1] This information is in keeping with the general concept that man during stress may react with his cardiovascular apparatus as if he were about to engage in strenuous muscular activity without any actual awareness of anticipating exercise.

Flynn and Wolf, Sheldon and Ball, reported a case study research on twenty year old twin girls. These subjects exhibited important differences even though they were identical as far as could be ascertained from birth history, early photographs, dominant handedness, finger prints, palm prints, blood groups, somatotypes, hair structure, and skeletal structures by X-ray. Major differences noted were: one had had arterial hypertension for eight years; the other was normotensive. One of the twins was behind through all developmental stages. She had been ill frequently with severe infections which had kept her from progressing in school and enjoying social activities. She had felt inferior to her sister since childhood. Flynn reported that both girls reacted vigorously as regards pressor and other cardiovascular hyperdynamic reactions in response to plunging their extremities in ice water. With regard to

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[1]Ira Stevenson and Charles H. Duncan, "Alterations in Cardiac Function and Circulatory Efficiency During Periods of Life Stress as Shown by Changes in the Rate, Rhythm, Electrocardiographic Pattern," Proceedings of the Association for Research in Nervous and Mental Diseases, XXIX (1950), 799-815.

blood pressure elevation, both responded vigorously, though not to the same degree, during interviews in which pertinent personal data were brought into focus. It thus appeared that not only were the twins similar in structure, but they responded similarly during stress. They exhibited identical protective patterns concerning mobilization for action; notwithstanding, only one had felt obliged to strive almost continuously from birth. The examiners postulated that in her cardiovascular system the hypertensive girl exhibited the effects of sustained attempts to compensate for her inadequacies, made especially apparent to her by the achievements of her more fortunate sister.[1,2]

Psychological Stress Related to Educational Learning Experiences

Thiesen and Meister studied stress as it affects learning. The hypothesis was postulated that a stressful situation gives rise to differential responses in individuals and a difference in the extent to which they are frustrated.

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[1]J. T. Kennedy Flynn and Stewart Wolf, "Essential Hypertension in One of Identical Twins: An Experimental Study of Cardiovascular Reactions in the Y Twins," Proceedings of the Association for Research in Nervous and Mental Diseases, XXIX (1950), 954-62.

[2]S. H. Sheldon and R. Ball, "Physical Characteristics of the Y Twins and Their Relation to Hypertension," Proceedings of the Association for Research in Nervous and Mental Diseases, XXIX (1950), 962-71.

Their frustrating situations involved failure in maze learning situations following previous successes where the subjects had expected to succeed. As measures of frustration states, the investigators took pulse rates, galvanic skin responses, blood pressures, hand tremors, respiration rates, the frustration indices being the changes from success to failure. They found that there was significant variability in the changes between subjects in the frustrating situations on the measures of galvanic skin reflex, pulse rate, and blood pressures, and thus confirmed the hypothesis that subjects differ significantly in the extent to which a frustration state is induced in a frustrating experience.[1]

In a study designed to show the relationship of anxiety to the performance in problem-solving situations as well as to basic Intelligence Quotient, Sarason administered a variety of tests (including figure drawing, Rorschach, and learning studies) to 100 elementary school children. The interference of high anxiety and stress, which they noted, appeared at all levels of intelligence. The child who scored high on the anxiety scales manifested greater interference in problem-solving situations than his peer who scored low despite the fact that both scored the same on an intelligence

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[1]J. W. Thiesen and R. K. Meister, "Laboratory Investigation of Frustration Tolerance of Pre-Adolescent Children," Journal of Psychology, LXXV (1959), 277-91.

test. This study indicated that there may be a characteristic lowering of intellectual control, attention and concentration in overly anxious individuals.[1]

Becker, Geer, and Hughes, in a study of undergraduates at the University of Kansas, reported the concern of students for grades. The investigators concentrated their study on the academic side of student life. Becker and Geer spent two years (1959-1961) at the University of Kansas participating in a wide range of student activities. Hughes served as a visiting professor for one year. On the basis of a large body of materials gathered from their extensive participatory observations, they concluded that student academic life could be definitively characterized mainly as the pursuit of grades.

As the students interacted with each other and with faculty at the University of Kansas, they collectively developed ideas to characterize their academic situations and modes of behavior for participation in the academic life of the University. The investigators used the concept of "perspective" to refer to this "complex of ideas and activities taken together." Perspective included collective definitions of situations, specifications of legitimate

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[1]S. Bernard Sarason, et al., Anxiety in Elementary School Children (New York: Wiley and Sons, Inc., 1960), pp. 159-160.

activities in these situations and criteria for evaluations of behavior of self and others. At the University of Kansas, the authors said, academic conditions were defined by most students in terms of the pursuit of grades; this obsession with grades, they termed the "GPA (grade point average) perspective." Their examination of student behavior revealed that students not only talked about getting grades but worked at it in a variety of ways, reinforcing this concern by using adequate grades as the criterion for choosing friends and for estimating their own worth. Both singly and collectively, students sought information about ways to achieve high grades. Collective efforts were utilized to encourage new students and to force recalcitrant ones to study and pursue high grades. Fraternities and sororities were particularly diligent in making their members perform adequately. If achievement could not be attained through legitimate means, or only at too dear a price, many students resorted to illegitimate ones.[1]

Mechanic studied stress in graduate students at the University of Wisconsin. The situation for study was the preliminary examinations for Doctor of Philosophy candidacy, how the situation was perceived by students, and how they

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[1]Howard S. Becker, Blanche Geer, and Everett C. Hughes, Making the Grade (New York: John Wiley and Sons, 1968), pp. 1-303, passim.

responded to it. The research focused on the behavior of twenty-two students taking the examinations; but to better understand their behavior it was also necessary to gather data from students' families, faculty members and other students.

In the study, stress was defined as "discomforting responses of persons in particular situations" in order to facilitate the study of adaptations in the sociological environment. It was the contention of Mechanic that "whether or not a person experiences stress will depend on the means, largely learned, that he has available to deal with the life situations." This concept is opposed to the concept of Selye.

The methods of study were: (1) weekly interviews with the students in the study; (2) periodic questionnaires given to the students taking the examinations and to other students who served as observers of behaviors; (3) questionnaires given to faculty members to identify faculty perceptions of their own interactions with graduate students, as well as their own attitudes toward the examinations; (4) interviews with faculty members, both formal and informal; (5) information obtained by the researcher while attending the faculty meeting concerned with the examinations; and (6) data were obtained by informal discussion, as lunches, informal visiting and participation in department activities.

Mechanic explored some of the modes of adaptation such as coping, interactional defense, and compensatory defense. In this study he described and analyzed the behavior of the students and cited examples of the behaviors observed in the adaptation processes. He described the students' social reactions with their family, other students and faculty members. In this stress situation, he concluded that students, in an effort to adapt to the stress of the examinations exhibited various behaviors. They recalled comforting cognitions of past successes in learning, identified with others undergoing similar experiences, used defense mechanisms such as joking, avoidance, hostility, magical-type thinking and creating a favorable picture of the future. The students began to learn exactly what stimuli interfered with adequate adaptation and how to cope with them in order to succeed.[1]

As a project in a previous class, this investigator did a pilot study of systolic blood pressure assessments of ten sophomore Associate Degree Nursing students at Grayson County College before and after a written information test in nursing and compared these reactions with those of ten nursing students in a regular lecture-discussion class in

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[1]David Mechanic, Students Under Stress: A Study in the Social Psychology of Adaptation (New York: Crowell-Collier Publishing Company, 1962), pp. 1-221, passim.

nursing. The statistical t-test showed no differences in systolic blood pressure assessments before and after the written information test for the experimental group, but the difference before the written information test and before the regular lecture-discussion class for the control group was significant at the .05 level of significance.[1]

Psychological Stress from Involvement with Illness

Wilson, a teaching chaplain, conducted unstructured seminars on nursing and personal values with groups of eight to twenty-five students from two diploma schools of nursing in Toronto, Canada. The topics raised by the students fell into two distinct groups: those concerning the role of the nurse, and those concerning the nurse's person. The concerns in the first group were the conflicting situations characteristic of the hospital experience: the dying patient, death, bereavement, the elderly, the problem patient, communication, euthanasia, sterilization, abortion and the unwed mother. The investigator noted that he had interviewed these students during a "mid-year slump," and that the students had spent their initial fervor for nursing and had

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[1]Lillian Jester, a Study of "Physiological Stress from Written Information Test." (Unpublished research paper, Texas Woman's University, 1971).

not yet acquired the status and professional role that would be theirs.

The students further discussed their loss of individuality, exhaustive concentration on the nursing field and constriction of interests. They saw nursing as a dull, frustrating experience from which escape seemed impossible, in terms of their investment in time, money, and effort. As a general rule, they did not admire the members of their profession whom they saw in the hospital, and deplored the narrowness, sense of frustration, apparent lack of concern for patients, and a seeming lack of ability to take criticism, that they observed in their seniors.

The students expressed disappointment with their nursing education since instructors spoke about nursing as a creative activity, but in the hospital hierarchy of administration, nursing seemed to be merely the execution of routine physical tasks. Wilson interpolated that these student responses were in no way peculiar to Toronto. This conclusion was based on his previous experiences with student groups of nurses in other areas in the United States.

Wilson's recommendations for alleviating the dilemma of the nursing student were: (1) Students should have the right of physical independence. The student nurse should be able to live in their homes or in dormitories independent of the administration of the school of nursing. They should be

allowed to manage their own finances, negotiating loans or funds under which they support their education. (2) Students should have provision of a viable occupational choice. The nursing curriculum should correspond and correlate with other education systems, so that the student may transfer to another field if desired. (3) The student nurse should receive recognition for creative performance. If what nursing education seeks is to develop responsible and resourceful practitioners, then it may need to be more flexible in its conception of the person of the nurse and the practice of nursing function.[1]

Hayes, using Zuckerman's Adjective Affect Check List, studied anxiety in sophomore nursing students. The test was administered to sixty-seven students. The results of the AACL showed that the students reported themselves as more anxious from day to day than "generally." They reported a considerable increase in anxiety before both examinations and after the final examination. Class days and clinical days were of no significance at anxiety levels except in new adjustments to the clinical area, especially to the psychiatric unit and to the operating room area where

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[1]Christopher Wilson, "The Effects of Cloisterization on Students of Nursing," American Journal of Nursing, LXX (August, 1971), 1726-29.

stressful situations may occur.[1]

Gordon and Gordon in 1967 studied sixty-nine nursing students at Wagner College, New York City. Sex and the number of siblings were obtained for each student, as well as her position in the sibship. The same data were gathered for a sample of 167 female students with every other college major. Blood chemistry levels--fasting uric acid, cholesterol, and glucose--were obtained on forty-three of the nursing students.

The significance of any birth order differences was analyzed by means of chi-square. With blood chemical findings, because of the small number of cases, data from firstborns were grouped with those from middle children and compared to those from lastborns. The findings of the study showed that significantly large percentages of girls with younger siblings selected a nursing major. Of those who withdrew from the nursing program, a significant number had younger sisters.

Blood chemicals, particularly high uric acid and fasting glucose levels, reflected good academic and extracurricular achievement as well as birth order. Firstborns were the best achievers and had the highest chemical levels;

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[1]Carol V. Hayes, "Measurement of Anxiety in Sophomore Nursing Students Using Zuckerman's AACL," Nursing Research, XV (Summer, 1966), 262-66.

the opposite was true of lastborns. Large percentages of the best-achieving students had unusually high uric acid, cholesterol, and glucose levels in their blood.[1]

In 1965 Cleland reported a study of the effect of situational stressors upon performance of nurses, modified by the need for social approval. An experiment was conducted using registered nurses as subjects and measuring their nursing test performance under conditions of graduated levels of situational stressors. These stressors were a part of the usual work environment, because they were of personal significance to the subjects.

The independent variables studied included: (1) need for social approval and (2) the situational stressors. The subject variable (need for social approval) was developed through the use of the Scale of Social Desirability designed by Crowne and Marlowe[2] as a measure of motivational level. Subjects who attribute a high proportion of culturally approved statements to themselves and who deny culturally unacceptable traits are inferred to have a high need for social approval. Subjects who endorse socially

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[1]Katherine K. Gordon and Richard E. Gordon, "Birth Order Achievement and Blood Chemistry Levels Among College Nursing Students," Nursing Research, XVI (1967), 234-37.

[2]David F. Crowne and David Marlowe, "A New Scale of Social Desirability Independent of Psychopathology," Journal of Consulting Psychology, XXIV (1960), 349-54.

desirable statements about themselves also are more likely to yield to group pressure in the conforming situation. Marlowe and Crowne used the scale as a measure of "social sensitivity." They predicted that subjects showing a high need for social approval would be more sensitive and responsive to situational demands, and would be defensive in test situations. The test scores earned by the nursing graduates in the study ranged very close to those of college students previously studied.

In measuring the situational stressors, no attempt was made to separate physical and mental stressors. The situational stressors from patient care assignments were measured and defined to form four gradations: (1) lowest level, (2) moderately low level, (3) moderately high level, and (4) highest level.

Two measures of the dependent variable, nursing performance, were obtained through the scores earned by the subject on two nursing tests designed especially for the study. These were a Nursing Achievement Test designed to evaluate cognitive behavior (knowledge, understanding, application, and critical thinking) and a Social Interaction Test which represented judgments for nurse-patient interactions in simulated clinical situations. Both tests were based on medical and surgical nursing content because of the fact that the subjects selected for the study were drawn

from these areas.

After random assignment of the sixty subjects, one group of nurses was tested while working under the four gradations of patient care assignments. The fifteen subjects assigned to a particular stressor condition were further divided into three groups; each group was composed of five subjects with high or medium or low need for social approval.

The findings of the study in summary are: (1) There is a curvilinear relationship between motivation and performance. (2) Subjects reach maximum performance on difficult test items at a lower stressor condition than for the less difficult items. (3) Corroboration was found for Easterbrook's hypothesis that an increase in motivation reduces the range of cues utilized by the subject, which in turn produces deterioration if the task requires responding to a wider range of cues than that which the subject can utilize. Easterbook defines "cues" as "environmental cues in any situation that an organism observes, maintains an orientation toward, responds to, or associates with a response."[1] (4) Subjects with a high need for social approval perform best under conditions of lowest situational stressors. (5) Subjects with a low need for social approval

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[1]J. A. Easterbrook, "The Effect of Emotion on Cue Utilization and the Organization of Behavior," Psychology Review, LXVI (1959), 183-201.

require moderate situational stressors to bring their motivational level up to optimum for maximum performance.[1]

Wolf reported studies concerning relative burdens of emotion and exercise on the cardiovascular system. The work of the heart associated vasomotor responses of surgeons standing at an operating table were found to equal those of men engaged in heavy labor involving moving and lifting heavy objects in a steel plant. This demonstrated a close correlation between myocardial oxygen consumption and the product of the peak systolic blood pressure and heart rate. Assuming this to be valid, he related total body energy to the energy expenditure of the heart. While performing a surgical operation, the caloric expenditure was low, averaging 1.8 calories per minute. Yet, certain surgeons expending 1.8 calories per minute showed an estimated myocardinal oxygen consumption equal to that of men doing heavy work in a steel mill. Foremen in the steel mill started and ended the day with higher pulse rates than those engaged in greater bodily activity, but who also had less responsibility. These experiments indicated the unsuspected demands upon the cardiovascular apparatus of ostensibly inactive persons during periods of responsibility.[2]

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[1]Virginia S. Cleland, "The Effect of Stress on Performance," Nursing Research, XIV (1965), 292-99.

[2]Stewart Wolf and Helen Goodell, Harold G. Wolff's Stress and Disease Revised (Springfield, Ill.: Charles C. Thomas Publishing Company, 1968), pp. 76-77.

Janis did psychological research with surgical patients who often use denial as a defense to stress. Patients who showed the least preoperative anticipatory fear were the most disturbed following surgery. After surgery they showed very intense anger and disappointment, and they resisted treatment designed to facilitate their post-surgical recovery. The patients who showed moderate amounts of anticipatory fear before surgery, in contrast, made the most successful adjustment following surgery. Janis suggested that the latter group was profitably able to do "the work of worrying" which prepared them for the discomforts and frustrations they were to experience later, mental work that was circumvented in those patients who successfully defended against threat prior to the operation.[1]

Graham and Conley studied common signs and behaviors which are generally accepted as physiological and psychological evidences of anxiety in preoperative surgical patients. The following signs or behaviors were chosen as meeting these criteria: (1) heart rate increased ten beats or more over basic rate for that patient, (2) systolic blood pressure increased ten mm. Hg. over basic pressure, (3) dryness of mouth, (4) perspiration, (5) generalized trembling or tremor of hands, (6) overactivity or

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[1]Ira L. Janis, Psychological Stress (New York: John Wiley and Sons, Inc., 1958), pp. 150-51.

restlessness, (7) clenching of fists, (8) nail biting or lip biting.

The sample of subjects consisted of seventy patients in a general hospital. Blood pressure readings, pulse rate recordings, and verbal manifestations from patients of anxiety using a three category ordinal scale depicting levels of anxiety were recorded. Observations were made and recorded of the other criteria for anxiety. The patients served as their own controls after surgery.

Statistical analysis of the pulse rate preoperatively showed no significant difference five to six days post-operatively. The proportion of patients having a pre-operative rise in blood pressure over their postoperative counterparts was statistically significant.[1]

Summary

The theoretical framework for this study included the physiological and psychological concepts of the stress of daily living. Concepts of stress identified through study and research indicate that stress is omnipresent, and is intensified in some life situations. Adaptation to varying levels of stress is basic to healthful living, for

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[1]Lois E. Graham and Elizabeth Myers Conley, "Evaluation of Anxiety and Fear in Adult Surgical Patients," Nursing Research, XX (1971), 113-22.

physiological manifestations from stress may precipitate disease if the stress is prolonged and severe.

This researcher included in the survey of related literature two studies of the stress of daily living. One study indicated that man during emotional stress may react in activity with his cardiovascular responses more intensely than during a period of emotional calm. The second study indicated that in life adjustments one individual may achieve life goals with healthful adaptation, but another moving in the same directions toward goals may find achievement stressful and manifest physiological symptoms of disease such as hypertension.

Since this study focused on the stress of Associate Degree Nursing students in a clinical nursing operating room learning experience as measured by the systolic blood pressure assessment, part of the related studies referred to the stress of the experiences of formal education. Studies cited in this chapter indicated that in all stages of the educational process, students experience anxiety and stress while striving to achieve. Progressively from elementary school, undergraduate school to graduate school, studies showed physiological and psychological manifestations of stress. Nursing students in a collegiate environment, according to a pilot study conducted by this investigator, showed physiological stress as measured by blood pressure assessments

in a written examination situation. From the use of both psychological and physiological measurements of stress, nursing students in other studies reflected indications of stress from theoretical learning experiences as well as in the application of the learning in the clinical areas with patients.

Since illness in a family unit is disruptive to the usual pattern of daily living, the problems involved are significant to the patients, nurses, physicians, and to society as a whole. Related studies cited indicated that through psychological and physiological testing, physicians and nurses are known to reflect body changes from their stress associated with the responsibility for the care of human lives. Patients show stress with illness. Studies cited indicated that surgical patients responded with stress before surgery, as did surgeons studied. No studies were found concerning the stress of the nurse or the student nurse while assisting the surgeon or surgeons while performing major surgery.

Chapter III will present an explanation of the procedures followed by the investigator in the development and implementation of the experimental phase of the study.

CHAPTER III

PROCEDURES FOLLOWED IN THE DEVELOPMENT OF THE STUDY

This study was initiated to identify the psychophysiological stress level of Associate Degree Nursing students while learning to assist the surgeon or surgeons as a member of the operating team in a hospital setting. Stress was measured by the assessments of the systolic arterial blood pressure.

In this chapter, the investigator has included the organizational plans for obtaining data to implement the development of the study. Procedures are grouped under the following center headings: (1) Preliminary Procedures, (2) Selection of the Subjects, (3) Plan for the Experimental Design and Experiment, (4) Selection and Description of the Instruments, (5) Collection of the Experimental Data, and (6) Treatment of the Data.

Preliminary Procedures

The information utilized in developing the present study was collected from both human and documentary sources. The subjects included thirty-six woman Associate Degree Nursing students in the sophomore class at Grayson County

College, Denison, Texas, enrolled in the summer session of 1971 in the course designed to teach nursing care of the surgical patient. Other human sources included the operating room supervisors in four different hospitals who assisted in the assessments of the systolic blood pressures. Documentary sources of data included books, periodicals, research studies, pamphlets, theses and dissertations and other materials pertaining to this study.

Permission for the sophomore nursing students to participate in the study was secured from the Director of the Associate Degree Nursing Program at Grayson County College. Cooperation in the study was secured from operating room supervisors in four hospitals in Sherman and Denison, Texas, where part of the experiment was conducted. These supervisors assisted with the blood pressure assessments of the subjects.

The investigator prepared a detailed tentative outline for the conduct of the study and presented it to the Thesis Committee members. After the Thesis Committee approval, on August 5, 1971, the prospectus for the study was presented and approved in Graduate Seminar held in the College of Health, Physical Education, and Recreation of the Texas Woman's University in Denton, Texas.

Selection of the Subjects

The investigator selected a group of sophomore student nurses who were being instructed to care for the surgical patient as subjects for the study. The class was composed of fifty-six students, ranging in age from eighteen years to thirty-eight years.

The recognized variables inherent in individual systolic blood pressure assessments prompted a pretest of systolic blood pressure assessments of the class to screen out extreme low and high assessments which would prevent the equating of the groups. After the screening pretest, a sample of thirty-six subjects was randomly placed into three groups for the experiments. (See Appendix A)

Plan for the Experimental Design and Experiment

For the purposes of this study, the investigator selected a factorial experimental research design for use with a pre-assembled group of students. The experimental phase of the study included three experimental groups of twelve subjects each. All three groups of subjects experienced a lecture-demonstration class in the college nursing laboratory to learn the procedures of the surgical hand scrub and putting on the sterile surgical gown and gloves. After learning the procedures for entering the

sterile operating area, the students learned how to function in the operating area in a simulated surgical operation.

Experimental group one had systolic blood pressure assessments before, during, and after the lecture-demonstration class. The hospital served as a setting for the learning experiences of groups two and three. Experimental group two subjects observed major surgery whereas experimental group three subjects actually assisted the surgeons at the operating table as members of the operating team. Systolic blood pressure assessments were taken before, during, and after the experiences for both of these experimental groups.

Selection and Description of the Instruments

The instruments employed in this study for the measurement of systolic blood pressure assessments were the sphygmomanometer and the stethoscope. These instruments meet the criteria of objectivity, validity and reliability in the selection of an instrument. The sphygmomanometer has been in use since 1733; the stethoscope has been in use since 1816.

The aneroid type of sphygmomanometer consistently used in this study is composed of a metal bellows, the inside of which is connected to a rubber compression cuff, which is applied over an artery. Variations of pressure

within the arterial system cause the bellows to expand and collapse. Movement of the bellows rotates a gear that turns a needle, pivoted on bearings, across a calibrated dial when the compression cuff is inflated through use of the attached rubber bulb pump.[1]

The stethoscope consists of rubber compression tubing connected in a Y-shape with a bell conductor for picking up arterial pressure sounds on the one end. Open plastic ear pieces are on the two ends of the rubber tubing.

To take blood pressure assessments, the operator applies the compression cuff of the sphygmomanometer over the brachial artery usually and inflates the compression cuff until the vessel collapses. With the stethoscope the operator listens for the first and last sounds of the arterial system, while slowly releasing the air from the compression cuff, and observing the calibrations on the manometer. The first sound heard by the operator is the systolic assessment.

Collection of the Experimental Data

For control of the variables within the measurements of the blood pressure assessments, the investigator established a procedure to be followed for taking all the

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[1]George E. Burch, Primer of Clinical Measurement of Blood Pressure (St. Louis: The C. V. Mosby Company, 1967), p. 38.

blood pressure assessments. The procedure stipulated that assessments be taken by the indirect ausculatory method on the left brachial artery with the subject in the sitting position.

Since the experiments were to be done in four different hospitals at the same times, the investigator selected assistants for taking blood pressure assessments. The investigator tested trial assessments with those assistants by means of a dual ear-piece stethoscope before the experiments began.[1]

The investigator established a schedule for the various experiments. The experimental phase of the study was conducted during the first summer session of 1971 for sophomore nursing students. Twelve subjects assigned to experimental group one had systolic blood pressure assessments before, during, and after a lecture-demonstration class in preparation for the operating room experience. Twelve students assigned to group two had assessments before, during, and after observing major surgery the following week. The remaining twelve students assisted the surgeon or surgeons at the operating table the following two weeks; systolic blood pressure assessments were determined before,

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[1]Beverly K. Glor, Elenore F. Sullivan, and Zane E. Estes, "Reproducibility of Blood Pressure Measurements: A Replication," Nursing Research, XXIX (1970), 170-72.

during, and after the experience of assisting with two major surgeries.

Figure 1 shows a flow chart of the schedules of the different steps during the experimental period.

Figure 1

SCHEDULE OF EXPERIMENTAL TESTING PROCEDURES FOR SYSTOLIC BLOOD PRESSURE ASSESSMENTS

June 1, 1971 8 AM - 12N Experimental group one Lecture-demonstration class Subjects 1 through 12 tested	June 8 & 9, 1971 8 AM - 12N Experimental group two Observing major surgery Subjects 13 through 20 tested June 8 Subjects 21 through 24 tested June 9	June 15 & 22, 1971 8 AM - 12N Experimental group three Assisting with major surgery Subjects 25 through 32 tested June 15 Subjects 33 through 36 tested June 22

Raw data collected from subjects in all experiments were recorded immediately. A record of this data may be found in Appendix B.

Environmental conditions were held constant. Experiments in all phases of the study were conducted between 8:00 A.M. and 12:00 noon. All experiments were conducted in

comfortable, cool areas in the college classroom and hospital surgical suites. In order to control certain extraneous variables subjects were requested to get an average amount of sleep the night before scheduled appointments, and to refrain from taking any sedative or tranquilizing drugs the night before the appointment time.

Treatment of the Data

In order to determine if significant relationships existed between the systolic blood pressure assessments of the experimental groups in this study of psychophysiological stress of nursing students in the operating room experiences, the one-way analysis of variance with repeated measures was applied to the data.[1,2] The Duncan's Multiple Range Test was selected to analyze the significance of the F ratios when indicated.

Summary

Chapter III included the sources of data and the preliminary procedures utilized for collecting the necessary

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[1]Deobold B. Van Dalen, Understanding Educational Research (New York: McGraw-Hill Book Company, 1966), pp. 401-406.

[2]James L. Bruning and B. L. Kintz, Computational Handbook of Statistics (Glenview, Ill.: Scott, Foresman and Company, 1968), pp. 43-47.

data for this study. Criteria for the selection of subjects participating in the study were established, and subsequently thirty-six students enrolled in the Associate Degree Nursing Program at Grayson County College, Denison, Texas, during the summer session of 1971, participated in the study. The instruments used to measure systolic blood pressure as measures of physiological stress were the anerobic sphygmomanometer and the stethoscope, which have long been used to measure blood pressure assessments in medical diagnostics.

Administrative steps and collection procedures of the experimental data were described. Since the experimental phase of the study was conducted in four different hospitals simultaneously, assistants in the hospitals were selected to aid in the assessment of blood pressures of the subjects. The design of the experiment, method for tabulation and computation of the data were also included in this chapter. The one-way analysis of variance with repeated measures was applied to the data. The Duncan's Multiple Range Test was selected to analyze the significance of the F ratios when indicated.

The presentation and interpretation of the data appear in Chapter IV of this study.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

This chapter contains the presentation of the statistical treatment of the data used to test the hypotheses of the study. An interpretation and discussion of the results of the statistical analysis are presented in narrative and tabular form.

The study was designed to determine the psychophysiological stress from clinical nursing operating room experiences as determined by the systolic blood pressure assessments of nursing students in an Associate Degree Nursing Program. A three group factorial experimental design was employed. In the study, all three experimental groups participated in a lecture-demonstration class simulating a surgical operation in preparation for the experience of assisting the surgeons with major surgery. Twelve of these nursing students were designated as experimental group one. They had their systolic blood pressure assessments taken before, during, and after the demonstration-class. In the hospital setting, experimental group two of twelve nursing students had their systolic blood pressure assessments taken before, during, and after observing major surgery, whereas, the third experimental group consisting of twelve nursing

students had their systolic blood pressure assessments taken before, during, and after assisting the surgeons as a member of the operating team.

Description and Equation of the Experimental Groups

The subjects in the study were thirty-six woman Associate Degree Nursing students enrolled in Grayson County College, Denison, Texas, during the first summer semester of 1971. From a class of fifty-six students, a sample of thirty-six was randomly assigned to the three experimental groups following the screening pretest administered to facilitate equating the groups as to systolic blood pressure assessments. Twelve students were placed in each of the three groups. The data presented in tabular form in this chapter are those assessments yielded by the thirty-six woman nursing students who completed the study.

The three groups were equated as to sex, formal educational and nursing experiences. The subjects were beginning second-year college students. They all had approximately the same amount of clinical nursing experiences in the first year of the nursing curriculum. There was no attempt to equate the subjects with respect to age because of the recognized variables of blood pressure assessments in association with age. The ages of the subjects ranged from eighteen to thirty-eight years. In order to control certain

extraneous variables of activity, the subjects were asked to get an average amount of sleep the night before scheduled appointments and to refrain from the use of any drugs before the appointment times.

The equating of the subjects according to their systolic blood pressure assessments was of significance in this study. Systolic assessments of the subjects ranged from 100 millimeters to 122 millimeters of mercury. The findings from the application of the one-way analysis of variance test for the significance of difference between the means of the independent groups of the assessments are presented in Table 2 and Table 3.

Table 2

DESCRIPTIVE DATA FOR THE THREE NURSE GROUPS IN EQUATING SYSTOLIC BLOOD PRESSURE ASSESSMENTS

Groups	1	2	3
Mean	111.66 mm.	110.50 mm.	113.33 mm.
Standard Deviation	22.00 mm.	14.50 mm.	13.20 mm.

Table 2 is a profile of the means and standard deviations of the three experimental groups. The mean for experimental group three (113.33) was higher than the means

for the experimental group one (111.66) and experimental group two (110.50). The standard deviations of experimental group two was 14.50 and that of group three was 13.20. The standard deviation of the experimental group one (22.00) was considerably higher.

Table 3 is a presentation of a one-way analysis of variance to show that the three experimental groups were equated according to systolic blood pressure assessments.

Table 3

SUMMARY OF ONE-WAY ANALYSIS OF VARIANCE FOR THE SIGNIFICANCE OF THE DIFFERENCE OF THE MEANS BETWEEN THE SYSTOLIC BLOOD PRESSURE ASSESSMENTS IN THE EXPERIMENTAL GROUPS IN THE PRETEST

Source	df	SS	MS	F
Between-Groups of Nurses	2	48.66	24.33	0.3911
Within-Groups of Nurses	33	2050.34	62.13	
Total	35	2099.00		

F 2, 33 = (.01) = 5.34
F 2, 33 = (.05) = 3.30

A study of Table 3 revealed that the F ratio of 0.3911 for between-group differences of means was neither statistically significant at the .01 level nor the .05 level

of confidence. The subjects in the three groups, therefore, were considered to be equated as to the systolic blood pressure assessments.

Presentation and Interpretation of the Findings

To determine the physiological stress of clinical nursing operating room experiences on the systolic blood pressure assessments of nursing students in an Associate Degree Nursing Program, the systolic blood pressure assessments were subjected to statistical treatment. To test the null hypothesis that there is no difference between the systolic blood pressure assessments of nursing students in the nursing lecture-demonstration class in preparation for the surgical assignment, observing a surgical operation, and assisting the surgeon or surgeons with major surgery as a member of the operating team, several statistical measures were employed. The first three specific hypotheses to be tested stated that there is no difference between the systolic blood pressure assessments of the three experimental groups before, during, and after the three stressor test conditions.

Three one-way analyses of variance were computed from the data of systolic blood pressure assessments obtained from the three groups. The systolic blood pressure assessments were evaluated before, during, and after the three allegedly

stressor conditions.

Descriptive data are shown in Table 4 for the study of the systolic assessments before, during, and after the learning conditions.

Table 4

SUMMARY OF DESCRIPTIVE DATA FOR SYSTOLIC BLOOD PRESSURE ASSESSMENTS IN ALL GROUPS

	Groups	Means	Standard Deviation
Before the Learning Experience	1 (Class)	111.67 mm.	8.81 mm.
	2 (Observing)	111.33 mm.	6.51 mm.
	3 (Assisting)	117.83 mm.	10.74 mm.
During the Learning Experience	1 (Class)	110.83 mm.	9.00 mm.
	2 (Observing)	113.00 mm.	9.28 mm.
	3 (Assisting)	117.33 mm.	7.64 mm.
After the Learning Experience	1 (Class)	109.67 mm.	9.06 mm.
	2 (Observing)	110.33 mm.	9.72 mm.
	3 (Assisting)	112.00 mm.	7.34 mm.

A study of Table 4 revealed that the mean of the systolic blood pressure assessments before the lecture-demonstration class was 111.67 and the mean of the assessments before observation of surgery was 111.33. The mean of

the assessments before subjects assisted the surgeons was somewhat higher (117.83). The standard deviation of the assessments for group one in the lecture-demonstration class was 8.81, while that of the assessments of group two observing major surgery was 6.51. The highest standard deviation of assessments was that of group three subjects before assisting the surgeons with major surgery (10.74).

Study of the second part of Table 4, during the experiences, revealed for experimental group one in the class a mean of 110.83, for group two observing surgery 113.00, and for group three assisting with surgery the highest of 117.33. The standard deviation of assessments of group one in class was 9.00 and that of group two observing surgery was 9.28. Group three assisting with surgery showed a lower (7.64) standard deviation of assessments.

Study of the third part of Table 4, after the experiences, revealed that group one in class showed a mean of assessments as 109.67. Group two observing surgery showed a mean of 110.33. Group three assisting with surgery showed a mean of 112.00. The standard deviations of assessments of group one was 9.06. The standard deviation of assessments of group two after observing surgery was 9.72, whereas the standard deviation of assessments of group three after assisting with surgery was 7.34.

Table 5 presents a summary of the three one-way analyses of variance for the significance of the differences of the means between the systolic blood pressure assessments of the three experimental groups before, during, and after the demonstration-class in preparation for the surgical experience, observing major surgery, and assisting with major surgery as a member of the operating team.

A study of Table 5 revealed that at the .05 level of confidence all three F ratios (2.0493, 1.7474, 0.2258) were not significant for between-group comparisons of the three experimental groups before lecture-demonstration class in preparation for surgery, before observing surgery, and before assisting the surgeons as a member of the operating team. The highest F ratio of 2.05 occurred with assessments before the experiences. The second highest (1.75) occurred with assessments during the experiences, while the lowest occurred after the experiences. The results of the analyses of variance indicated that the degree of stress as measured by systolic blood pressure was not significantly different for the three experimental groups at any of the three testing intervals, before, during, or after exposure. This finding supported one of the delimitations of the study that stated that the experiences in which the nursing students were involved might not be significantly stressful. This finding may also be related to the theory of Basowitz

Table 5

SUMMARY OF ONE-WAY ANALYSES OF VARIANCE FOR THE SIGNIFICANCE OF THE DIFFERENCE OF THE MEANS BETWEEN THE SYSTOLIC BLOOD PRESSURE ASSESSMENTS FOR THE THREE GROUPS IN THE LEARNING EXPERIENCES

	Source	df	SS	MS	F
Before the Learning Experience	Between-groups of nurses	2	321.56	160.78	2.05
	Within-groups of nurses	33	2589.00	78.45	
Total		35	2910.56		
During the Learning Experience	Between-groups of nurses	2	262.89	131.44	1.75
	Within-groups of nurses	33	2482.33	75.22	
Total		35	2745.22		
After the Learning Experience	Between-groups of nurses	2	34.67	17.33	0.23
	Within-groups of nurses	33	2533.33	76.77	
Total		35	2568.00		

F 2, 33 = (.01) = 5.34 (.05) = 3.30

and his associates who indicated that allegedly "stressful situations" do not always produce discomforting responses in individuals.[1]

In order to test the three specific hypotheses that there is no difference between the within-group repeated-measures of before, during, and after the class, observing surgery and assisting with surgery, the investigator employed the statistical tool of the treatments-by-subjects or repeated-measures design of analysis of variance. Table 6 is a summary of the descriptive data of the analyses of variance with repeated-measures.

Table 6

SUMMARY OF DESCRIPTIVE DATA FOR ANALYSES OF VARIANCE FOR THE SIGNIFICANCE OF THE DIFFERENCE OF THE MEANS BETWEEN THE SYSTOLIC BLOOD PRESSURE ASSESSMENTS FOR THE THREE GROUPS

Groups	Means	Standard Deviations
1 (Class)	110.72 mm.	10.60 mm.
2 (Observing Surgery)	111.55 mm.	11.60 mm.
2 (Assisting with Surgery)	115.72 mm.	13.25 mm.

[1] Basowitz, et al., Anxiety and Stress, p. 7.

A study of Table 6 revealed that the mean of the repeated-measures of systolic blood pressure assessments of group one before, during, and after the class was 110.72, while those subjects observing surgery had a mean of 111.55. The mean for the subjects assisting with surgery was the highest (115.72). The standard deviations of the assessments of the subjects were 10.60, 11.60, and 13.25 respectively, the highest occurring with the group assisting with surgery.

Table 7 is the presentation of a summary of the analyses of variance with repeated-measures to show the significance of the difference of the means between the systolic blood pressure assessments of group one before, during, and after class, of group two before, during, and after observing surgery, and of group three before, during, and after assisting with surgery.

A study of the first part of Table 7 revealed that the difference of the means of the systolic blood pressure assessments of nursing students in the lecture-demonstration class in preparation for the experience of assisting with surgery was not statistically significant at the .05 level of confidence. This finding conformed with the findings of a previous study of systolic pressure assessments of nursing students before and after a class by this investigator.[1]

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[1]Jester, "Physiological Stress from Written Test"

Table 7

SUMMARY OF TREATMENTS-BY-SUBJECTS ANALYSES OF VARIANCE OF THE THREE GROUPS IN THE LEARNING EXPERIENCE

Groups	Source	SS	df	MS	F
	Total	2673	35	--	
1	Subjects	2353	11	--	
(Class)	Treatments	24	2	12	0.89
	Error	296	22	13.5	
	Total	2497	35	--	
2	Subjects	2038	11	--	
(Observing surgery)	Treatments	44	2	22	1.15
	Error	415	22	19	
	Total	2753	35	--	
3	Subjects	2060	11	--	
(Assisting with surgery)	Treatments	250	2	125	6.20*
	Error	443	22	20.14	

df 2, 22 = .01 = 5.72
.05 = 3.44

The second part of this table revealed an F ratio of 1.15 for the difference of the means of systolic assessments of nursing students before, during, and after observing major surgery. This ratio was not statistically significant at the .05 level of confidence. This higher F ratio than that of nursing students in the class represented a more stressful experience than that of the class, even though the students were simply observing the surgery.

The third analysis of variance in the last part of Table 7 revealed a statistically significant value of 6.20 at the .05 level. This significant ratio of the difference of means occurred from the systolic pressure assessments of nursing students before, during, and after the experience of assisting the surgeons. This finding related to the study of Hayes concerning anxiety levels of sophomore nursing students, using Zuckerman's Adjective Affect List. The students reported a considerable increase in anxiety before both examinations and after the final examination. Class days and clinical days were of no significance at anxiety levels except in new adjustments to the clinical area, especially to the psychiatric unit and to the operating room area where stressful situations may occur.[1]

Since a significant F value was indicated from the difference of the means of systolic assessments of group

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[1]Hayes, "Measurement of Anxiety," pp. 262-66.

three students before, during, and after assisting with surgery, a Duncan's Multiple Range Test was performed to determine where the significant difference existed. Table 8 indicates the results of the Duncan's Multiple Range Test.

Table 8

TABLE OF DIFFERENCE FOR DUNCAN'S MULTIPLE RANGE TEST BETWEEN ORDERED MEANS FOR MEAN VALUES OF SYSTOLIC BLOOD PRESSURE ASSESSMENTS OF GROUP THREE ASSISTING WITH SURGERY

	After	During	Before		
	112.00	117.33	117.83	K	R
112.00	----	5.33	5.83*	3	5.747
117.33		----	.50	2	5.487

*= .05 level of confidence

Duncan's Multiple Range Test in Table 8 revealed that the mean of the systolic assessments of nursing students before assisting with surgery was significantly different at the .05 level from the means of the assessments of the nursing students during and after assisting with surgery. This finding appeared to support the findings of Wolf and Goodell which showed increased work load on the heart with resulting increased arterial blood pressure at the operating

table.[1] The finding concurred with the study of James concerning surgical patients showing increased arterial blood pressure before surgery.[2] Graham and Conley also reported increased arterial blood pressure in preoperative patients.[3]

New and challenging experiences may influence the level of the blood pressure, particularly the level of the systolic pressure.[4] For example, while preparing for activity of sports, athletes experience accelerated heart action, causing the blood pressure to soar, driving the blood through the muscles.[5]

Explanation of the physiological responses of the body as to blood pressure changes involves the action of of epinephrine from the adrenal medulla which in general produces a hypertensive state, or anticipatory stress, from increased cardiac output. The increased pressure in the heart stimulates the vagus nerve. This vagus stimulation suffices to suppress the direct action of the epinephrine by

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[1]Wolf and Godell, Stress and Disease, pp. 76-77.

[2]Janis, Psychological Stress, pp. 150-51.

[3]Graham and Conley, "Evaluation of Anxiety," pp. 113-22

[4]Blas Moia, "The Range of Normal Blood Pressure," Cardiology, IV, ed. by Aldo A. Luisado (New York: Blakiston Division, McGraw-Hill Book Company, Inc., 1959), p. 15.

[5]Laurence E. Morehouse and Philip J. Rasch, Sports Medicine for Trainers (Philadelphia: W. B. Saunders Company, 1963), p. 35.

slowing the heart and modifying the blood pressure.[1] The means in Duncan's Multiple Range Test reflected these changes of systolic assessments of the nursing studies during and after assisting the surgeons as a member of the operating team.

Summary

In this chapter the results of the investigation to determine the physiological stress from clinical nursing operating room experiences as determined by the systolic blood pressure assessments of nursing students in an Associate Degree Nursing Program were presented. A three group factorial experimental design was employed. In the study all three experimental groups participated in a lecture-demonstration class simulating a surgical operation at the college nursing laboratory in preparation for assisting the surgeons as a member of the operating team. Twelve of these students were designated as experimental group one. They had their systolic blood pressure assessments before, during, and after the class. In the hospital setting, experimental group two of twelve students had systolic blood pressure assessments before, during, and after observing surgery, whereas group three of twelve students had systolic blood pressure

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[1]Sigmund Grollman, The Human Body (New York: Macmillan Company, 1964), pp. 577-583.

assessments before, during, and after assisting with surgery.

The subjects in the study were thirty-six woman Associate Degree Nursing students enrolled in Grayson County College, Denison, Texas, during the first summer semester of 1971. From a class of fifty-six students, a sample of thirty-six was randomly assigned to the three experimental groups following a screening pretest to facilitate equating the groups as to systolic blood pressure assessments. The groups were equated in essential elements for experimental study. They were equated statistically by an analysis of variance as to systolic blood pressure assessments.

To determine the physiological stress from clinical nursing operating room experiences on the systolic blood pressure assessments of Associate Degree Nursing students, the systolic blood pressure assessments were subjected to statistical treatment. To test the hypothesis that there is no difference between the systolic blood pressure assessments of nursing students in the nursing lecture-demonstration class in preparation for the surgical assignment, observing major surgery, and assisting the surgeons with major surgery as a member of the operating team, three one-way analyses of variance were used. Results of the one-way analyses of variance computed to determine significant differences between the means of the systolic assessments

before, during, and after the operating room experiences of the three experimental groups revealed that there were no significant differences for between-group differences. The means showed little change except for the means of the systolic assessments before and during assisting with surgery which increased somewhat.

In order to test the three specific hypotheses that there is no difference between the within-group repeated-measures of before, during, and after the class, observing surgery, and assisting with surgery, the investigator employed three treatments-by-subjects or repeated-measures design of the analysis of variance. These analyses showed a statistically significant F ratio at the .05 level for the systolic assessments of the experimental group assisting with surgery. Those assessments of the groups observing surgery and in the class were not significant. The F ratios showed an increase from the assessments of the students in the class, observing surgery, and assisting with surgery.

To determine where the factor of stress was significant, Duncan's Multiple Range Test was employed. Based on this test, the stress before assisting with surgery was identified as significant statistically at the .05 level.

In Chapter 5 of this thesis, a summary of the study, conclusions based upon the findings, and recommendations for further study will be presented.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY

Basic to this study is the concept of the Stress and General Adaptation Syndrome as identified by Selye. Selye and others have identified the manifestations of the stress of daily living as both physiological and psychological. Ramifications of these manifestations indicate a vast health problem and a need for more health education, especially in the area of involvement with the cardiovascular system. Cardiovascular diseases are the leading cause of death in the United States. About twenty-seven million adults in this country have some form of cardiovascular disease.[1]

The present study focused on the psychophysiological stress of the Associate Degree Nursing student in the learning role of assisting the surgeon or surgeons with a major surgical operation. Measurement of stress was the systolic blood pressure assessment. The systolic blood pressure assessments were evaluated before, during, and after clinical operating room experiences. The study entailed the use of three groups of nursing students equated with respect to

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[1]American Heart Association, Questions and Answers (New York, 1968), p. 6.

educational and nursing experiences. They were equated statistically with respect to systolic blood pressure assessments. Each group was comprised of twelve female subjects, ages eighteen through thirty-eight years, who were enrolled in the Associate Degree Nursing Program at Grayson County College, Denison, Texas, during the first summer semester of 1971. The three experimental groups participated in a lecture-demonstration class simulating surgery at the college nursing laboratory. Twelve of these students designated as experimental group one had systolic blood pressure assessments before, during, and after this class. In the hospital setting, group two had systolic pressure assessments before, during, and after observing surgery, whereas the third experimental group had assessments before, during, and after assisting surgeons as a member of the operating team. To determine if there were any significant differences between the groups before, during, and after these experiences a one-way analysis of variance was used. To determine if there were any significant differences within the groups, a treatment-by-subjects with repeated measures analysis of variance was used. When significant differences were found, a Duncan's Multiple Range Test was used to determine where the differences existed.

The following findings were obtained from the study:

1. A comparison of the systolic blood pressure

assessments between the three groups in the clinical operating room experiences revealed that:

a. There was no significant difference between the systolic pressures of the groups before the clinical operating room experiences.

b. There was no significant difference between the systolic pressures of the groups during the clinical operating room experiences.

c. There was no significant difference between the systolic pressures of the groups after the clinical operating room experiences.

2. A comparison of the systolic blood pressure assessments within the three groups in the clinical operating room experiences revealed that:

a. There was no significant difference between the systolic pressures of group one before, during, and after the lecture-demonstration class.

b. There was no significant difference between the systolic pressures of group two before, during, and after observing surgery.

c. There was a significant difference between the systolic pressures of group three before, during, and after assisting with major surgery. Duncan's Multiple Range Test revealed that the mean of the systolic pressure assessments was higher

before the subjects assisted the surgeons as a member of the operating team.

Based upon the findings of the study, the investigator failed to reject the following null hypotheses:

1. There is no significant difference between the systolic blood pressure assessments of nursing students before the lecture-demonstration class in preparation for the experience of surgery, before observing surgery, and before assisting the surgeons as a member of the operating team.

2. There is no significant difference between the systolic blood pressure assessments of nursing students during the lecture-demonstration class, during observing surgery, and during assisting the surgeons as a member of the operating team.

3. There is no significant difference between the systolic blood pressure assessments of nursing students after the lecture-demonstration class, after observing surgery, and after assisting the surgeons as a member of the operating team.

4. There is no significant difference between the systolic blood pressure assessments of nursing students before, during, and after the lecture-demonstration class in preparation for the experience of surgery.

5. There is no significant difference between the

systolic blood pressure assessments of nursing students before, during, and after observing major surgery.

The investigator failed to accept the following hypothesis: There is no difference between the systolic blood pressure assessments of nursing students before, during, and after assisting the surgeons with major surgery.

Conclusions of the Study

It may be concluded that the clinical operating experiences of participating in the lecture-demonstration class simulating surgery and observing major surgery did not create a significantly stressful experience psychophysiologically for the nursing students. Before assisting the surgeons as a member of the operating team, the nursing students did experience psychophysiological stress as measured by the systolic blood pressure assessments. The findings of the present study were limited, however, by the small number of subjects who participated in the study and by the duration of the trials.

Recommendations for Further Study

After conducting the experiment with nursing students in the role of learning to assist the surgeons as a member of the operating team and analyzing the results of the present study the investigator recommends that the following

studies be undertaken:

1. A study similar to the present one with a longer experimental period using larger samples.

2. Studies of nursing students in other presumably stressful experiences, as with the patient in cardiac arrest.

3. A study of both systolic and diastolic blood pressure assessments of operating room nurses over a period of at least one to five years.

4. A study of both systolic and diastolic blood pressure assessments of surgeons over a period of at least one to five years to observe for the possible development of hypertension.

5. A study of surgeons with diagnosed hypertension who continue to perform surgery and involve the risk behaviors for maintenance of health.

6. Studies in other professional and occupational groups for manifestations of stress.

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APPENDIX A

RANGE OF SYSTOLIC BLOOD PRESSURES
OF SUBJECTS AFTER PRETEST

100 millimeters - 122 millimeters
of mercury

APPENDIX B

RAW DATA RECORD OF SYSTOLIC BLOOD PRESSURE ASSESSMENTS

Subjects	Treatments (before) 1	(during) 2	(after) 3	Subjects	Treatments (before) 1	(during) 2	(after) 3	Subjects	Treatments (before) 1	(during) 2	(after) 3
	Group 1				Group 2				Group 3		
1	100	104	108	13	110	106	100	25	100	110	108
2	118	120	112	14	120	126	120	26	130	124	120
3	120	116	118	15	110	106	100	27	110	120	116
4	100	92	90	16	110	108	104	28	118	112	110
5	120	118	116	17	120	128	122	29	134	128	120
6	116	114	116	18	116	124	130	30	114	110	102
7	100	106	110	19	110	118	112	31	112	108	104
8	100	98	94	20	100	106	98	32	110	106	100
9	120	116	110	21	116	110	110	33	128	122	118
10	116	118	120	22	114	118	112	34	110	120	116
11	114	118	110	23	110	102	108	35	116	122	110
12	116	110	112	24	100	104	108	36	132	126	120