THE EFFECT OF CONTROLLED BREATHING AND SUPPORTIVE PHYSICAL TOUCH UPON WOMEN'S RESPONSES TO THEIR LABOR CONTRACTIONS

by

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ABSTRACT

The purpose of this study was to evaluate the effect of nursing intervention, specifically, controlled breathing and supportive physical touch upon women's responses to their labor contractions. The study also involved further development and use of tools for measuring responses of women to their labor contractions.

The sample included behavioral and physiological data for 18 women during labor. There were five primigravidas and 13 multigravidas.

The supportive procedures were alternately applied to and withheld from each woman in active labor during sets of five contractions. Physiological and psychological responses were measured at the end of the fifth contraction in each set. The physiological responses were measured on the basis of blood pressure, pulse rate, Galvanic skin response and skin temperature readings. The psychological responses were rated in terms of behavioral responses in five areas: vocal response, physical response, breathing response, facial expressions response, and verbal response in terms of attitude toward particular contractions.

The study showed no significant difference between the mean experiment and the mean control contractions for pulse and skin temperature. The difference was significant for systolic blood pressure between the mean of control scores during the first half of the subjects' observed contractions and the second half of their observed contractions at the .05 level. The mean of the experimental scores during the first half of the subjects' observed contractions and the second half of their observed contractions was at the .01 level. The mean of the first
half of the control scores versus the first half of the experimental scores was at the .05 level.

The difference was significant for Galvanic skin response between the mean of total number of experimental scores and the mean of total number of control scores at the .05 level. The mean of the second half of the control scores versus the second half of the experiment was at the .05 level.

The difference was significant for behavioral scores between the mean of total number of experimental scores and the mean of total number of control scores at the .001 level. The mean of control scores during the first half of the subjects' observed contractions and the second half of their observed contractions was at the .001 level. The mean of the experimental scores during the first half of the subjects' observed contractions and the second half of their observed contractions was at the .01 level.

The results of the study showed that the behavioral tool was sensitive and easy to use in obtaining variations in response. The other tools need further study in relation to timing of use and accuracy of instrumentation before they can be considered valid and reliable. However, the variations in scores obtained indicate their potential usefulness as the problems with their utilization are resolved. There is a need for further development of bio-instrumentation which is convenient and accurate for the clinical setting. Simultaneous recording of all physiological measures would greatly enhance the value of the data obtained.
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CHAPTER I

INTRODUCTION AND LITERATURE RESEARCH

Today's world is one of industrialization and technology, and, consequently, one with an overall societal structure in a state of constant evolution. Technological advancement has erased many hardships inherent in the eternal struggle for human survival, has provided many new opportunities for human development, and has stimulated the ongoing progress of humankind as a whole. Technology has also, however, rendered life much more complex, vastly accelerated its everyday rhythm and, too often, has become an end in itself. Beyond the often detrimental and currently controversial environmental impact of sophisticated machinery and its accoutrements, technology also has had a deleterious effect on many individual human beings in modern society. The vital human relationships established between people working together have often been replaced by the cold, mechanical operation of machines. The hectic pace of the industrialized world has induced people to focus all their energies on mechanical functioning, rather than on each other. The individual is, therefore, cut off from his fellow human beings and finds himself alone and lonely in a world populated by millions.

Hospitals and medical facilities are not immune to this kind of alienation from humanity. Modern equipment has advanced the effectiveness of the health profession immeasurably, and the results
of scientific research have increased the potential for alleviating
disease and disability as never before.

Modern instrumentation provides for heretofore unequalled
accuracy and proficiency in diagnosis and treatment. These advantages,
however, may be coupled with the almost inevitable process of dehuman-
ization. The patient's condition is no longer determined solely by the
touch of a hand, but is often measured by computers. A patient does
not physically call a nurse for help, but activates a buzzer. The
nurse may remain at a desk and read the data projected by a monitor,
rather than personally investigating the patient's needs. The increased
use of mechanical equipment may allow the nurse time for care of more
patients, but it can and does decrease the human interaction time. As
the nursing staff is reduced by a cost-conscious administration in favor
of the more economical equipment, the nurse ultimately may be left with
a minimum of time for her patients.

A situation which minimizes the amount of real human contact
between nurse and patient benefits neither. This relationship between
the sick and healing calls out for change. The need for human contact
to carry out the process of providing comfort and healing demands that
the achievements in bio-engineering be used to augment human care, not
to replace it. A balance between the technological and human aspects
of medical treatment must be sought and eventually attained.

In obstetrics, technological advances have included electronic
monitoring of the fetal heart, electric pump infusion of pitocin to
stimulate uterine contractions, and epidural anesthesia to eliminate
painful sensations during labor. However, varying degrees of discomfort
during the labor progress remain a reality. Nurses and nurse-midwives face a continuing challenge to assist the expectant mother to maintain a tolerable degree of comfort and to cope effectively with the sensations of labor whether or not they additionally utilize medication and technology.

Pain, although a complex physiological and psychological phenomenon, is nevertheless a personal experience. McCaffey (1972) defines pain clinically as: "Pain is whatever the experiencing person says it is and exists whenever he says it does" (p. 218). Pain is an abstract concept that refers to sensation, stimulus and response (Sternbach, 1968).

The most current view of pain is the Gate control theory. It is hypothesized that two major components affect the experience of pain: (1) the central control mechanism, and (2) the stimulation of A-alpha fiber output, both of which may block the transmission of A-delta and C fibers at the pre-synaptic level. These latter fibers are believed to carry the messages that result in the pain experience and subsequent aversive behavior.

Casey (1973a) reports tests concerning the stimulation of the peripheral somatosensory nerve, supporting the hypothesis that A-delta and C fibers transmit pain. He furthermore reveals that the A-alpha fibers were associated with touch or tap sensations when electrically stimulated. He writes:

Pain results from appropriate stimulation of the surface, deep tissues, or visceral organs of the body and is overtly manifested by aversive behavior and by signs of autonomic nervous system activity such as changes in blood pressure, heart rate and respiration. (p. 194)
Siegels (1974) states that the teaching of Gate Control theory, both pre- and post-operatively, has proved to be effective in reducing pain. Anxiety is a major cause of intensified pain perception; if the patient learns to establish a trusting, caring, supportive relationship with those who are caring for her, her fears are more likely to be dispelled and she is able to participate more actively in her own care.

Mastrovito (1974) emphasizes that pain is perceptual and it is different from the other senses because it involves emotion. Mastrovito states that emotional and physical factors such as location, type, and intensity of pain; the person's emotional situation during the pain; his history of response to it, character and perspective in relation to it; which people he discloses his pain to; and his type of disclosure must all be considered. On the basis of this perceptual view of pain, Mastrovito discusses hypnotic suggestion as beneficial to the right individual, as it can give one confidence, reduce anxiety, and in general create a sense of identity for the individual. This suggestion, however, can work only with people who desire it, believing it will help them.

Mastrovito (1974) says there are many varied responses people have to pain, according to their own associations. Some people may feel that they are burdened by the hand of fate and they may cruelly lash out at other pain-free people, while some may retreat and become totally dependent on others. From the transactional aspects, Szasz (1955) explains that a person's pain, because the real cause is not always recognized right away, may lead to the patient having bad feelings if the pain is not treated adequately. The pain must be regarded
in two ways: as a physiological response or a psychological cry for help. Since the patient may not be aware that he might be in emotional conflict which could cause pain, others who are treating him must take this into consideration. Many times a patient is treated with drugs, and if he feels pain more intensely because of emotions, the drugs may not help, so more frustration can occur.

Melzack and Chapman (1973) discuss the importance of psychological factors in relation to pain. Attention, suggestion, anxiety, depression and hysteria are factors included in this study. Early conditioning rewards for suffering and social factors are also mentioned as playing a part in determination of pain. Attention, they state, involves a choice as to what a person directs his attention to, and therefore may be a controlling factor in one's response to pain. If a person centers his attention totally on the pain, it may seem worse than it really is. Suggestion functions with attention as it harnesses it and can direct it.

Melzack and Chapman (1973) also state that good effects result from alpha feedback training pertaining to pain. It is a self-training technique whereby alpha waves in the brain are controlled and a person sometimes falls into a meditational state, or is able to stall pain in a migraine. During practice of this alpha-feedback, there are many pain lessening factors, including a calming effect and the awareness that the pain can be controlled. This technique has been very helpful to some patients. It is very simple, using hypnotic instructions which are related to progressive relaxation and self hypnosis.

An important study done by Hardy and Javert (1950) reveals that
there is no skin pain threshold variation before and during the stages of childbirth. They discovered this by measuring millicalories produced during these time periods, finding that the thresholds remain the same. They also believe that unless there is cervical dilatation, contractions produce little pain. The theory is based on their findings that the most painful contractions, when measured during the second stage of labor, are surprisingly only as painful as a third degree burn pain. They find this is due chiefly to the damage of lower tissue caused by dilatation and stretching.

Physiologically, Hardy and Javert (1950) also support their theory with these findings: pitocin-induced and Braxton Hicks contractions are fairly painless unless the cervix dilates; uterine contractions under the use of Caudal anaesthesia are painless as cervical nerves are blocked; in post-presacral neurectomy, contractions are painless.

In summary, Hardy and Javert (1950) base their findings on the fact that the autonomic nervous system is largely responsible for pain during labor. The first stage pain, brought by stimuli from this system, is created by cervical dilatation; the second stage of labor, induced by somatic sensory pudendal nerves, is stimulated by perineal dilatation. Their conclusions are, that although drugs including anaesthetics and analgesias are beneficial, and although labor may be aided by a psychological outlook (non-medical technique), the pain may not be reduced. And there is no one prescribed way to take action concerning the reduction of labor pains.

McCaffey (1972) raises many questions in regard to pain and
its treatment. Some of these questions are: What are the patient's behavioral responses to her pain experiences? What are the influencing factors related to the patient's behavioral responses and her pain sensation? What is the nursing diagnosis for the patient with pain? What nursing intervention may assist the patient during her pain experience? What is revealed in the evaluation of the effectiveness of nursing intervention for the patient?

Having recognized the role of psychological factors in pain perception, Dr. Richard J. Stevens (1976) proposes five major strategies which have proven effective in the reduction of pain perception. These include, first of all, a systematic relaxation of the patient, both physically and emotionally. Then, dissociation and interference strategies, requiring distraction and attention focusing, are put into play in order to aid the patient in the achievement of cognitive control. This is supported by a third strategy, cognitive rehearsal, which involves a clear explanation of the pain the patient is about to experience. Through the Hawthorn effect, the results of all previous strategies are strengthened; the more intensively the strategies are enacted, the more effective they become. Finally, systematic desensitization, a combination of the other strategies, serves to alleviate anxieties over various aspects of the painful, fear-inducing experience at hand.

Joyce Cameron summarizes nursing application of the Gate control theory during childbirth. In her unpublished manuscript she states that the nurse can encourage a patient to trust her body (i.e., to know that the body is capable of performing all functions necessary for successful
childbirth. It "knows" when to go into labor, how to open the cervix, and how to guide the baby out into the world. The nurse can also advise the mother to work with the labor herself, to be aware of what is happening to her, and what to do about it. The mother should try to avert pain by attaching a meaning other than "pain" to the sensations she is experiencing (e.g., "tight," "pressure," "pull," and so forth); she should also distract herself, placing her focus somewhere else, relaxing, and breathing correctly. The second aspect of the Gate Control concept involves the patient's body (i.e., the use of relaxation and breathing techniques), counter sensations (i.e., the use of pressure, massage, heat or cold), and positioning for comfort and labor progress (e.g., standing, walking, leaning, or sitting in a rocking chair or straight chair).

According to Johnson (1965), the individual's conception of touch and his responses to it will be different. She ascribes this difference to factors of age, social and cultural influences, and childhood experiences. If a nurse has inhibited responses to touching her patients, she may be expressing her own inhibitions about being touched. Therefore, Johnson believes that a nurse should be aware that touch is closely related to the types of verbal responses she and the patient will exchange. Johnson also states that silent communication during childbirth is comforting, and when the right words are expressed, they enhance the non-verbal exchange. She also says, however, that talking may confuse a situation if non-verbal impulses appear to mean something different.

Robin (1963) also describes the importance of touch in the
relationship between nurse and mother. Through touch, they will gradually become more competent in gathering information about one another. Touch becomes a source for the nurse from which to make a diagnosis, and is a very effective mode of communication between her and the patient. Each will be able to recognize and interpret body signs such as body heat, perspiration, and skin texture. The fluctuations of any of these elements, produced by physical or psychological work, can again be interpreted as favorable or unfavorable. Each will become sensitive to the other's tactile needs. In this way, nurse and mother achieve a level of communication not possible through mere words.

The interest of nurses and nurse-midwives in increasing the comfort and coping abilities of women during labor led to the development of a tool for describing women's behavioral responses during contractions. Initial development was by Saltenis (1962) with further refinement and use by Sturrock (1972), Henningson (1972), and Vijatrasil (1976). They utilized the behavioral tool to measure changes over time using the woman in labor as her own control. During sets of five contractions, no supportive care was offered by the nurse, alternated with sets of five contractions during which such modalities as touch, breathing, comfort measures and cognitive support were liberally applied. Measurement data using the behavioral tool and later pulse and blood pressure were obtained during and at the completion of every fifth contraction. Comparison between supported and non-supported contractions indicated some significant difference in response, even though the labor process was increasingly more demanding as it progressed.

It was recognized by previous researchers that additional
physiological response data would be highly desirable in future studies. Recent technological developments have made such measuring instruments available, although they are far from being perfected.

This researcher was interested in the further development and use of tools for measuring responses of women to their labor contractions. It is believed that valid and reliable tools would permit a variety of research projects to be conducted studying the relative effectiveness of varied approaches to childbirth management of normal women. One such approach, the use of touch and controlled breathing in a context of physical and emotional support and comfort measures acceptable to the laboring woman, has shown much promise through the studies described above. The indication that women, in fact, had a more effective behavioral and physiological response to their contractions under this approach, led this researcher to the present study.

Therefore, the purpose of this study was to evaluate the effect of physical touch and controlled breathing upon the mother's ability to cope with her contractions during labor and to gather further normative data on the range of behavioral and physiological responses of women during labor and to compare the behavioral and physiological responses of women during supported and non-supported sets of contractions during the first stage of labor.
CHAPTER II

METHODOLOGY

Setting

This exploratory study was carried out in the labor and delivery unit of St. Mark's Hospital in Salt Lake City, Utah. This is a general hospital of three hundred beds and an average of 100 to 150 deliveries per month.

Sample

The sample included twenty women in early and active labor who participated in the project voluntarily. A convenience sample of women who met the study criteria and who were in labor during the time the researcher was present was utilized. Data were collected during a five-week period during which the researcher was almost constantly available. The researcher worked with the first two women in a trial effort to determine how best to meet the research objectives with minimum imposition on the subjects. Experience with these two women provided an awareness of which procedures were feasible. These findings, in conjunction with previously planned procedures, helped to formulate a final plan of action and establish the protocol.

Each subject functioned as her own control. The control treatment consisted of sets of five contractions, alternated with the experimental treatment. The experimental treatment also consisted of
sets of five contractions; however, physical touch and controlled breathing were administered as the treatment. Data were obtained at the end of each set of contractions (see Study Explanation, Appendix C).

Sample Size

The size of the sample for this study was projected to be thirty women in labor--fifteen primigravidas and fifteen multigravidas. The subjects were to be at term without complications. Due to unexpected instrumentation difficulties and the subsequently limited time for the research, it was not possible to carry out the proposal exactly as planned. Data were collected on only eighteen women--five primigravidas and thirteen multigravidas. The specified nursing interventions were carried out by the researcher for each woman.

Criteria for Data Collection

The following criteria were used for the data collection in this study:

1. term gestation (38 to 42 weeks)
2. no complications (e.g., bleeding, toxemias, diabetics, cephalopelvic disproportion, and so forth)
3. cervical dilatation of at least 2-3 centimeters, or regular contractions occurring at intervals of 5 to 10 minutes or less
4. informed subject who gave voluntary consent
Definitions

Following are definitions of terms used in this research:

Supportive procedure (experimental). The procedure was undertaken in connection with a set of five contractions during which the researcher and/or the husband provided physical touch and encouraged controlled breathing.

Non-supportive procedure (control). A set of five contractions during which neither physical touch nor controlled breathing was provided by the researcher. A record was kept of whether touching was carried out by anyone else, by whom, for what purpose, and whether the mother attempted to control her breathing on her own initiative.

Physical touch. This was defined as functional physical contact between the researcher and/or the husband and the expectant mother during the contractions. This procedure included placing the hand on the mother's shoulders, arms, legs, or other body parts and resting it there gently during the supportive period; lightly moving a piece of cold, wet cloth down the mother's extremities and encouraging her to relax in response to its touch. The touching proceeded initially from the face down to the neck and shoulder, to the wrist, from the chest and abdomen to the hip and ankle, and finally to the back. The mother was encouraged to relax through repeated verbal reinforcement, that is, suggestions of topics for calm contemplation were made.

Controlled breathing. The subject was encouraged to make use of any previously learned breathing method. If no such learning had taken place, a very simple breathing technique was demonstrated for her. The latter required that she take a few deep breaths, inhaling
through the nostrils and exhaling through the mouth, just prior to, during, and just after every contraction. This procedure demanded increased concentration from the mother and also from the nurse. The nurse observed the patient carefully in order to prevent hyperventilation and the concomitant decrease in the amount of oxygen conveyed to the fetus.

The researcher. The researcher was the nurse responsible for performing physical touch and encouraging controlled breathing. She also carried out, as needed, usual nursing measures for comfort, such as assistance with positioning, provision of a cool cloth, dry underpads, and ice chips. These activities were held constant throughout labor and were utilized as necessary according to the progress of the patient, regardless of experimental or control procedures.

Tools

Dependent Variables

A behavioral scale and several physiological measures were utilized for the dependent measures. Physiological responses to the stress of the contractions were measured by pulse rate, blood pressure, skin temperature, Galvanic Skin Response (GSR) and Electromyogram (EMG). The above data were obtained at the conclusion of the fifth contraction in each set. In addition to these physiological data, the researcher also rated the behavioral responses during the fifth contraction of each set, according to the Sturrock Labor Coping Scale.

Sturrock Labor Coping Scale

This scale (Appendix A) is composed of five major areas:
(1) vocal, nonverbal responses, (2) physical activity, (3) control of breathing, (4) facial expression, and (5) verbal expression of attitude. A three-point score of 0, 1 or 2 is given in each area. A score of zero indicates a lack of self-control and a total inability to cope with the contraction; 1 is indicative of an average coping response; and 2 indicates a superior coping response. The composite score, the sum of scores obtained in each of the five categories, ranges from 0 to 10 points. The lowest scores point toward the lowest level of possible coping response, while the highest scores suggest the highest coping response. This tool has been tested in previous studies (Henningson, 1972; Vijatrasil, 1976; Sturrock, 1972) and comparative data obtained may be seen in Table 2, p. 28.

**Galvanic Skin Response Scale (GSR)**

Geddes (1975) states:

The terms galvanic skin response (GSR) [or psychogalvanic response (PGR)] and electrodermal response (EDR) designate two phenomena: the change in resistance and the appearance of a voltage measurable between one electrode in an area richly supplied by sweat glands and another in a region devoid of them. The change in resistance (the Fere effect) is now called the exosomatic response. The appearance of a voltage (the Tarchanoff phenomenon) is now termed the endosomatic response. . . . Both events appear in response to an emotional stimulus and reflect a change in the activity of the autonomic nervous system. (p. 389)

According to Gregg (1973), Relax Pax (Advanced Electro Lab, Pomona, California) is an instrument which monitors the effects of the parasympathetic nervous system by measuring the relative conductivity of the skin. Acetylcholine is the agent of the parasympathetic nervous system and is released from these nerve endings in smooth muscles all over the body. This release in smooth muscles near the surface of the skin causes perspiration.
and can be monitored directly since its conductance is proportional to the amount and the degree of perspiration present. This parameter is monitored with a galvanic skin response (GSR) monitor. The relative conductance of the skin is converted to a tone by the Relax Pax so that as the conductance increases, the pitch of the tone increases. (p. 2)

The Relax Pax was attached to an isolator box and a frequency counter machine (supplied by the Department of Electrical Engineering, University of Utah). The frequency counter was not compatible with Relax Pax, therefore an optical isolator was necessary to isolate power systems. The latter serves to translate the audible tones produced by the frequency counter, which expresses the intensity and degree of nervous activity into more easily recordable digits. The recording scale on the frequency counter ran from zero upward, in whole numbers and decimals, to three places (e.g., 1.012). The sensors were attached to the index and ring fingers of the right or left hand of the patient using electrode gel.

Electro Myograph Scale (EMG)

According to Gregg (1973), Relax Pax is an instrument which senses the nerve impulses which activate skeletal muscles. When a muscle is contracted the instrument senses the nerve firings and converts them to audible sounds and a meter reading. When the muscle is at rest, no sounds are heard. (p. 2)

The Relax Pax was attached to an isolator box and a frequency counter machine (Heath Kit 1B-1100). The latter serves to translate the audible tones produced by the former (which expresses the intensity and degree of nervous activity) into readable and more easily recordable digits. The recording scale on the frequency counter ran from zero upward in whole numbers and decimals to three places (e.g.,
The active and reference electrodes were placed onto the calf muscles of both legs (one on each) and firmly attached through straps.

**Pulse Scale**

According to Mosby (1977), pulse "is alternate expansion and contraction of a blood vessel" (p. 44). She also describes that with each ventricular contraction blood is ejected intermittently from the heart into the aorta causing variation in pressure within the vessels.

In normal labor, Ziegel and Cranly (1978) say there is little change in pulse except for some variation during contraction. They consider 100 beats per minute is the maximum normal pulse rate, but Pardee and Mendelson (1941) have shown it may occasionally go as high as 110 beats per minute.

The radial pulse rate was counted for a half minute by the researcher in this study. The number was then doubled. It was done by placing the pads of the index and middle fingers over the radial artery at the wrist until maximum pulsation was detected.

**Blood Pressure Scale**

According to Guyton (1976), "Blood pressure means the force exerted by the blood against any unit area of the vessel wall" (p. 228).

Beland and Passos (1975) state:

The arterial blood pressure is measured in two phases. The measure of the force with which the left ventricle ejects blood into the aorta is the systolic pressure and represents pressure at its highest in the arterial system. The measure of the force of the blood in the arterial system when the left ventricle and the vascular channels are relaxing is the diastolic pressure and represents pressure at its lowest level. Although the systolic pressure is a valuable source of information about the force of left
ventricular contraction, the systolic pressure also is influ-
enced markedly by the distensibility of the aorta and major arteries, the blood viscosity, and the total volume of the blood. The diastolic pressure, which reflects the condition of the peripheral vessels, is considered by some clinicians to be the more important of the two pressures because it indicates the stress to which the blood vessels and heart are subjected during relaxation. (p. 579)

Hellman (1971) states that there is little change in blood pressure between contractions during the first stage of labor, but an average increase of about 10 mm hg is normal during contractions.

In this study, the deflated compression cuff was applied around the right or left arm (with the brachial artery approximately at heart level) without any constriction. The lower border of the cuff was about 2.5 cm above the antecubital fossa. The stethoscope was placed firmly but without undue pressure over the brachial artery in the antecubital space. The same apparatus was used by the researcher for all patients in the study.

Skin Temperature Scale

According to Guyton (1976) the hypothalamus controls the blood flow into the skin through two mechanisms of sympathetic vaso-constriction and sympathetic vasodilation. Cooling the Temperature Control Center in the hypothalamus causes vaso-constriction and cessation of sweating (secretion of norepinephrine). Heating the Temperature Control Center in the hypothalamus causes vasodilation and sweating (secretion of acetylcholine). Guyton states: "In times of circulatory distress, such as during exercise, following severe hemorrhage, or even in states of anxiety, sympathetic stimulation of these venous plexuses can force large quantities of blood into the internal vessels" (p. 381).
Thus, according to the above statements, the temperature scale might be indicative of the patient's physiological distress in relation to the amount and type of secretions in the blood (e.g., norepinephrine or acetylcholine).

In this study, a Model 5810 Digital Thermistor Thermometer (Yellow Springs Instrument Co., Ohio, U.S.A.) was used in recording the patient's responses to cold or hot stress conditions which involve neuroendocrine hormonal changes.

A non-immersible, epoxy-tipped probe, with a time constant of 0.6 seconds, suitable for temperature measurements on surfaces was attached to the thermometer in order to read skin temperature.

The probe was attached to the ball of the patient's foot, between the first and second toes. The black surface of the probe touched the skin, while the stainless steel side was turned away from the skin. The probe was secured through bandages and occasionally checked in order to preserve its initial position. The machine recorded integers and decimals to one place (e.g., 3.1).

**Preliminary Preparation**

After approval of the research project by the faculty and the University's Human Subject Research Committee, the researcher looked for a hospital in Salt Lake City that would provide a setting appropriate for the experiment. The acquisition of permission to base the research in the Obstetrics Department at St. Marks' Hospital was facilitated through advice of the head nurse of that department. Through her, the researcher was directed to the head of the Obstetrics Department, who
ultimately obtained approval from all other obstetrician members and the Hospital Research Center. The researcher made frequent visits to the St. Marks' Obstetrics Department in order to become acquainted with the staff, doctors, and physical arrangement of the Department. These visits and explanations of the study which were given to the Head Nurse and also were posted at the ward desk served to stimulate staff members' interest in the project. An unexpected delay in transportation of necessary instruments from California to Utah necessitated a postponement of the starting date of the research. This delay was reported to the staff, but also gave the researcher and staff more time to discuss the project and to get to know each other better.

Upon arrival of the instruments, the committee appointed a student of Bioengineering to modify damaged or inappropriate equipment which had been sent from California.

The problems posed by the faulty machines required two weeks' work on behalf of the Bioengineering student before they could function adequately. After all instruments were in order, the researcher used them at home, on herself, in order to become acquainted with their possible physiological and psychological effects, and to determine their feasibility for the staff, the patient, and the researcher. Directly prior to inception of the research per se, the equipment was used on members of the staff on the ward who were willing to participate and who had the available time. This was done in order to obtain reactions from the professionals' point of view experiencing the machines in the hospital environment. Furthermore, the instruments had to be arranged carefully in the very limited physical space so as not to impede normal
Following the conclusion of these arrangements, the research was begun. The first day of the research revealed that the EMG was not functioning accurately. The EMG furthermore proved itself to be inconvenient for the staff and uncomfortable for the patient. It was therefore decided to omit the EMG from the protocol. As a result, the patients tested on the first day were not included in the final evaluation of the research. One of the most important things to mention at this point is the constant maintenance of rapport between the researcher and the staff. The staff provided invaluable feedback as to the quality of the researcher's work and gave helpful suggestions as to how to improve it. They became interested in the experiment and informed their fellow staff members about it which created a situation of cooperation and involvement which was beneficial to the researcher and to the course of the research.

Protocol

The procedure consisted, first of all, in providing information concerning the study to the patient. When all admitting procedures had been completed and the patient comfortably settled in her new environment, she was given a brief oral and written explanation of the research and was asked whether she would like to participate. The information sheet and the consent form were left with the patient for several minutes so that she had time to consider the plan and make her own decision. The researcher returned later in order to clarify any questions she might have and to assure her that she could interrupt the
process at any time without interfering with ongoing normal treatment. Finally, the patient was shown the equipment to be used in order to acquaint her with it and to allay any possible fears.

Preparations for the normal nursing and measuring procedures were then undertaken. Tools for nursing were made ready (i.e., powder, wet flannel, a paper fan, ice cubes, and a comb). The tools necessary for measurement were also prepared: electromyogram (EMG), Galvanic Skin Response machine (GSR) and attachments, skin temperature apparatus, blood pressure apparatus and stethoscope, watch with second hand, and a record sheet. The same apparatus was used for each subject to avoid any variation in results due to different performance of individual apparatuses.

Prior to beginning the experiment, the above instruments were used to obtain baseline measurements. A random choice was then made as to whether the treatment should be begun with the experimental or the control procedure. This decision was effected through the simple tossing of a coin. Subsequent to the inception of the experiment itself, further readings were made after every sequence of five contractions. These latter measurements were made in conjunction with observations of the contraction graph produced by the electronic fetal monitor.

For the duration of the experiment, a certain sequence of treatment was employed. During experimental treatment, the patient's personal needs were first fulfilled and her comfort assured (e.g., giving a back massage, changing wet pads, and positioning the patient). Her face was massaged with a cool, wet piece of flannel before the
contractions began. Throughout, the patient was asked for feedback (i.e., whether she was comfortable and relaxed, whether she liked the treatment as administered, or if she would prefer it done in some other manner). Any suggestions she may have made were taken into consideration so that she was able to relax as much as possible. This treatment was augmented with the aforementioned suggestions of subjects for meditation conducive to relaxation (e.g., calm nature scenes of flowing rivers and so forth). Directly after each contraction during the experimental phase, the patient was rewarded for her efforts. She was given ice to cool and hydrate the tissues in her mouth and throat or to chew on as a means of muscle exercise or to release built-up tensions. She was touched gently in appreciation of her efforts; this physical touch was reinforced through verbal praise. She was furthermore shown the readings on the GSR as visual proof that her performance was "good."

In order to encourage continued controlled breathing and relaxation, the nurse breathed with the patient, while again describing placid nature scenes in a rhythmical, soothing voice. At all times when there were no contractions, the nurse would complement the experiment by observing the patient's emotional and intellectual responses. Feedback from the patient (and from the husband, if present), therefore, was largely received through the patient's own spontaneous comments and expression of her feelings. The nurse, on the other hand, would give the patient feedback through explaining the positive readings on the GSR, as explained above. The GSR was furthermore employed to cause distraction from pain and discomfort for the patient. Also, if the patient raised any question concerning the nature of the procedure,
or exhibited fear of any kind, the procedure was explained again and the patient reassured.

During the control contractions, the researcher refrained from touching, nursing measures, and so forth. From time to time she left the room or stayed in the room and occupied herself with charting or rearranging equipment and supplies. However, the researcher observed the patient and the husband, making note of what the husband was doing for the patient during that period of time. All data were recorded on a worksheet (see Appendix B) and later transferred to coding sheets for computer processing. Appropriate graphs were also prepared for visual analysis of fluctuations in response throughout the labor.
CHAPTER III

RESULTS AND FINDINGS

Frequency data were obtained at the University of Utah Computer Center (UU/CC) using the Univac 1108 computer and the SPSS Program. Two-tailed t-tests for independent and related measures were manually computed with a hand calculator to determine differences between means. Confidence levels were established at the 0.05 level. This was chosen due to the exploratory nature of this study.

The sample included behavioral and physiological data for eighteen patients during labor. There were five primigravidas and thirteen multigravidas. One woman was Puerto Rican; the rest were Caucasian-American. All primigravidas had attended classes in preparation for childbirth. One of the multigravidas had attended classes for this pregnancy but the rest had attended during their previous pregnancies. Seventeen of the mothers had their husbands present and one had her mother present during labor. Two received no medication with induction; one received only nisentil; one received nisentil with induction; one received nisentil and a paracervical block, twelve received a paracervical block with pudendal and nisentil; and one received paracervical and pudendal with induction. Twelve of the 18 patients had induction of labor, five with oxytocics only, two with oxytocics and amniotomy, and five with amniotomy only (see Table 1).
<table>
<thead>
<tr>
<th>No.</th>
<th>Parity</th>
<th>Age</th>
<th>Onset Temp (cm)</th>
<th>Induction</th>
<th>Type of Delivery</th>
<th>Placenta Delivery</th>
<th>Time from 3-4 until delivery</th>
<th>Total Time of Data Collection</th>
<th>Medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0000</td>
<td>18</td>
<td>3 97.4°F Amniotomy</td>
<td>N.V.D.</td>
<td>Spontan.</td>
<td>220 (3:40)</td>
<td>180 (3:00)</td>
<td>Nisentil, Paracervical</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0002</td>
<td>20</td>
<td>6 97.8°F Amniotomy</td>
<td>N.V.D.</td>
<td>Spontan.</td>
<td>216 (3:24)</td>
<td>139 (2:19)</td>
<td>Nisentil (2), Paracervical, Pudendal</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1001</td>
<td>26</td>
<td>4 98.4°F Amniotomy</td>
<td>N.V.D.</td>
<td>Spontan.</td>
<td>219 (3:05)</td>
<td>115 (1:55)</td>
<td>Nisentil, Paracervical, Pudendal</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1001</td>
<td>26</td>
<td>4 98.0°F Oxytocics</td>
<td>N.V.D.</td>
<td>Spontan.</td>
<td>205 (3:25)</td>
<td>180 (3:00)</td>
<td>Glucose saline, Nisentil, Paracervical, Pudendal, Bucal Pitocin</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4003</td>
<td>36</td>
<td>4 -- Oxytocics</td>
<td>N.V.D.</td>
<td>Spontan.</td>
<td>214 (3:20)</td>
<td>120 (2:00)</td>
<td>Nisentil, Induction</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>3003</td>
<td>28</td>
<td>4 -- Oxytocics</td>
<td>N.V.D.</td>
<td>Spontan.</td>
<td>206 (3:28)</td>
<td>195 (3:15)</td>
<td>Nisentil, Paracervical, Pudendal, Bucal Pitocin</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>2002</td>
<td>25</td>
<td>3 97.8°F --</td>
<td>N.V.D.</td>
<td>Manual</td>
<td>156 (2:25)</td>
<td>130 (1:00)</td>
<td>Nisentil, Paracervical, Pudendal</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1011</td>
<td>31</td>
<td>3 -- Both</td>
<td>N.V.D.</td>
<td>Spontan.</td>
<td>125 (2:03)</td>
<td>125 (2:20)</td>
<td>Induction</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3023</td>
<td>30</td>
<td>4 98.0°F --</td>
<td>N.V.D.</td>
<td>Spontan.</td>
<td>277 (4:37)</td>
<td>235 (3:55)</td>
<td>Nisentil, Paracervical, Pudendal</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>3013</td>
<td>27</td>
<td>4 97.6°F Oxytocics</td>
<td>N.V.D.</td>
<td>Expressed</td>
<td>246 (4:06)</td>
<td>230 (3:50)</td>
<td>Induction, Nisentil, Paracervical, Pudendal</td>
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</tr>
<tr>
<td>11</td>
<td>0010</td>
<td>23</td>
<td>4 98.6°F --</td>
<td>N.V.D.</td>
<td>Spontan.</td>
<td>414 (7:24)</td>
<td>425 (7:05)</td>
<td>Nisentil, Paracervical, Pudendal</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>0000</td>
<td>26</td>
<td>4 99.0°F Amniotomy</td>
<td>Forceps</td>
<td>Spontan.</td>
<td>213 (3:33)</td>
<td>235 (3:55)</td>
<td>Nisentil, Paracervical, Pudendal</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>1021</td>
<td>29</td>
<td>4 98.4°F Oxytocics</td>
<td>N.V.D.</td>
<td>Spontan.</td>
<td>467 (7:47)</td>
<td>420 (7:00)</td>
<td>Bucal Pitocin (3), Glucose Saline, Paracervical, Pudendal</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>1001</td>
<td>21</td>
<td>3 99.4°F --</td>
<td>N.V.D.</td>
<td>Spontan.</td>
<td>265 (4:28)</td>
<td>210 (3:30)</td>
<td>Nisentil</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>0001</td>
<td>26</td>
<td>4 -- Amniotomy</td>
<td>Forceps</td>
<td>Spontan.</td>
<td>244 (4:04)</td>
<td>240 (4:00)</td>
<td>Nisentil (2), Paracervical, Pudendal</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>0000</td>
<td>22</td>
<td>5 98.6°F --</td>
<td>N.V.D.</td>
<td>Spontan.</td>
<td>073 (1:13)</td>
<td>065 (1:05)</td>
<td>Nisentil, Paracervical, Pudendal</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>0000</td>
<td>23</td>
<td>5 100.5°F --</td>
<td>N.V.D.</td>
<td>Spontan.</td>
<td>157 (2:37)</td>
<td>135 (2:15)</td>
<td>Nisentil, Paracervical, Pudendal</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>0000</td>
<td>28</td>
<td>4 99.0°F Both</td>
<td>N.V.D.</td>
<td>Spontan.</td>
<td>220 (3:40)</td>
<td>130 (2:10)</td>
<td>Induction</td>
<td></td>
</tr>
</tbody>
</table>

Table 1

Parity, Age, Cervical Dilatation at Onset, Type of Delivery, Total Time in First Stage, Researcher's Time with Each Patient and Medication Received by Each Patient.
Their ages ranged from 18 to 36 years with a mean age of 25.8 years. Cervical dilatation at the onset of data collection ranged from 3 to 5 centimeters with a mean of 3.7 centimeters. Data collection was terminated either at complete dilatation or at 9 centimeters cervical dilatation depending on when the patient was moved to the delivery room. There were sixteen normal, spontaneous deliveries and two forceps deliveries.

The pulse, blood pressure, behavioral responses, Galvanic skin response, and skin temperature were taken and recorded at the end of every fifth contraction in conjunction with observation of the graph produced by the electronic fetal monitor. The control (C = non-supportive) and experimental (E = supportive) procedures were provided alternately by the researcher for each "set" of five contractions. The time spent by the researcher with patients ranged from 1.0 hour to 7.05 hours; the mean time was 3.17 hours.

**Behavioral Scale**

The first research tool dealt with a description of the patient's behavioral response to the labor contractions during the first stage of labor. A total of 835 contractions occurred in eighteen subjects during the study period. The total number of evaluations (during and following every fifth contraction) was 167, with 10 observations missing for a total recorded 157 observations. The total number of observations (during and after every fifth contraction) per subject ranged between 3 to 18 observations (15 to 90 contractions) with a mean of 9.2 and standard deviation of ± 4.6 observations.
The original study by Saltenis (1962) used four categories of the present behavioral scale. The fifth category, facial expression, was added by Henningson (1972) followed by a more detailed definition for the same five scales developed by Sturrock (1972). The previous study to this one by Vijatrasil (1976), as well as the present study, utilized the 1972 refined five-category scale, with a ten-point scoring system.

Table 2 shows a comparison of results using this scale in the five studies done to date.

Table 2
COMPARISON OF BEHAVIORAL SCALE RESULTS USING A FIVE-CATEGORY SCALE

<table>
<thead>
<tr>
<th>Researcher</th>
<th>No. of Subjects</th>
<th>Total No. Contraction Sets</th>
<th>Range of Behavioral Scores</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saltenis</td>
<td>21</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Henningson</td>
<td>17</td>
<td>138</td>
<td>1 to 10</td>
<td>5.52</td>
</tr>
<tr>
<td>Sturrock</td>
<td>10</td>
<td>83</td>
<td>1 to 10</td>
<td>6.84</td>
</tr>
<tr>
<td>Vijatrasil</td>
<td>16</td>
<td>166</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Farahbod</td>
<td>18</td>
<td>157</td>
<td>0 to 10</td>
<td>8.00</td>
</tr>
</tbody>
</table>

\(^a\) Observation every third contraction.

\(^b\) Observation every 10 minutes (no experimental treatment).

\(^c\) Observation every fifth contraction; score not obtainable from report.
It may be seen that the previous researchers were able to obtain a wide variability in total score (e.g., 1 to 10 on a 0 to 10 scale) thus indicating the sensitivity of the tool.

Behavioral score variability for 157 observations in the present study ranged from 0 to 10 with a mean of 8.0 also indicating sensitivity of the instrument. Mean scores of subjects ranged from 3.4 to 10 with the mean of the means 8.00. This indicates that overall, the subjects were in relatively good control throughout their labor, whether or not they were receiving the experimental or control treatment. The cumulative mean score for all control observations was 7.3; the cumulative mean score for all experimental observations was 8.8.

A $t$-test for related measures between the mean of the total number of experimental scores and the mean of the total number of control scores indicated a $T$ score of 5.94 with a $p$ value of < .001. This indicates a significant difference between behavioral scores obtained during the experimental treatment and behavioral scores obtained during the control treatment over the course of labor.

A $t$-test for related measures between the mean of the control scores obtained during the first half of the subjects' observed contractions (first half of their total observations, e.g., first half of their observed labor) and the second half of their observed contractions (e.g., second half of their total observations or second half of their observed labor) indicated a difference between their mean scores of $T = -4.99$ ($n = 17$ subjects) for a $p$ value of < .001.

A $t$-test for related measures between the means of the experimental scores during the first and second half of observations
(labor) revealed a $T = -3.61$ (n = 16 subjects) for a $p$ value of < .01.

It should be noted that where there were an uneven number of observations for a subject, the middle observation was omitted and the means of the first and last half of the labor observations were computed. Where there were missing data, the number of observations was too few to have observations in both time periods (e.g., less than two observations of control or experimental type).

It should also be noted that although labor was progressing and the dilatation increasing, both the control scores and the experimental scores in the last half of the subjects' observations were higher (better) than in the first half. In other words, as the labor progressed, the subjects' behavioral response to the contractions improved. There are several possible hypotheses for this occurrence:

1. increased medication in the later half improved their responses (scores)
2. increasing response to the experimental treatment (i.e., supportive measures) improved their responses
3. a combination of medication and experimental treatment improved their responses (scores)

**Pulse Scale**

The total number of evaluations (baseline and following every fifth contraction) equaled 167 for 18 subjects, with 17 missing observations for a total recorded of 150 observations. There was a range of 3 to 18 observations with a mean of 9.2 observations per subject and a standard deviation of ± 4.6.
Table 3
COMPARISON OF PULSE SCORES WITH PREVIOUS STUDIES

<table>
<thead>
<tr>
<th>Researcher</th>
<th>No. of Subjects</th>
<th>Total No. Contraction Sets</th>
<th>Range of Pulse Scores</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Saltenis</td>
<td>21</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Henningson&lt;sup&gt;a&lt;/sup&gt;</td>
<td>17</td>
<td>138</td>
<td>C 68-104</td>
<td>82.082.00</td>
</tr>
<tr>
<td>Sturrock&lt;sup&gt;b&lt;/sup&gt;</td>
<td>10</td>
<td>83</td>
<td>E 60-100</td>
<td>80.00</td>
</tr>
<tr>
<td>Vijatrasil&lt;sup&gt;c&lt;/sup&gt;</td>
<td>16</td>
<td>166</td>
<td>60-100</td>
<td>84.50</td>
</tr>
<tr>
<td>Farahbod&lt;sup&gt;c&lt;/sup&gt;</td>
<td>18</td>
<td>157</td>
<td>60-112</td>
<td>80.00</td>
</tr>
</tbody>
</table>

<sup>a</sup>Observation every third contraction.

<sup>b</sup>Observation every 10 minutes (no experimental treatment).

<sup>c</sup>Observation every fifth contraction.

Table 3 is a comparison of pulse scores with previous studies. Ziegel and Granley (1978) state: "Except in prolonged labors, the maternal pulse rate ordinarily shows little change even during severe contractions." However, Pardee and Mendelson (1941) have shown that it may occasionally go as high as 100 per minute.

In this study, the range of scores was 60 to 112 beats per minute with the range of means 65.5 to 98.5. The mean pulse for all the means was 83.7. The mean score for all the experimental means was 83.3. The mean score all the control means was 80.0. A t-test for related measures between the mean of the total number of experimental scores and the mean of the total number of control scores showed no significant statistical difference.
The t-test for related measures between the mean of the control scores obtained during the first half of the subjects' observed contractions and the second half of their observed contractions showed no significant difference.

The t-test for related measures between the means of the experimental scores during the first and second half of observations (labor) showed no significant difference. The lack of a significant difference could be due to recording error because of the rapid slowing of the pulse after a contraction. A more precise method would have been to take the pulse immediately at the end of the contraction for six seconds then multiply by 10 to obtain beats per minute. It is interesting to note that the mean control contractions were lower than the mean experimental contractions. This was an unexpected finding. Possibly the experimental treatment raised the pulse rate even though behaviorally the subject was calmer during this time. Further investigation of this phenomenon is required.

**Blood Pressure Scale**

The total number of evaluations (baseline and following every fifth contraction) equalled 167 for 18 subjects, with 26 missing blood pressure readings for a total recorded of 141 observations. There was a range of 3 to 18 observations with a mean of 9.2 observations per subject and a standard deviation of ± 4.6. Missing data was due to patient's interruption (going to the bathroom) or staff's interruption (giving medication, vaginal examination, and so forth). Table 4 gives comparative scores with previous studies.
Table 4

COMPARISON OF BLOOD PRESSURE SCORES WITH PREVIOUS STUDIES

<table>
<thead>
<tr>
<th>Researcher</th>
<th>No. of Subjects</th>
<th>Range Systolic Score</th>
<th>Mean Systolic C</th>
<th>Range Diastolic Score</th>
<th>Mean Diastolic C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saltenis</td>
<td>21</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Henningson</td>
<td>17</td>
<td>98-160</td>
<td>119.0</td>
<td>117.0</td>
<td>68-104</td>
</tr>
<tr>
<td>Sturrock</td>
<td>10</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Vijatrasil</td>
<td>16</td>
<td>96-144</td>
<td>120.8</td>
<td>116.2</td>
<td>50-100</td>
</tr>
<tr>
<td>Farahbod</td>
<td>18</td>
<td>105-160</td>
<td>127.4</td>
<td>126.5</td>
<td>65-100</td>
</tr>
</tbody>
</table>

\(^a\) Observation every third contraction.

\(^b\) Observation every 10 minutes (no experimental treatment).

\(^c\) Observation every fifth contraction.

Hellman, Pritchard and Williams (1971) state that during the first stage of labor there is little change in blood pressure between contractions, but during contractions an average increase of about 10 mm hg is normal.

In this study the range of systolic blood pressure scores was 105-160 with the range of means 113-153. The mean systolic blood pressure for all the means was 126.2. The mean score for all experimental means was 126.5. The mean score for all control means was 127.4.

A t-test for related measures between the mean of the total number of experimental scores and the mean of the total number of control scores showed no significant difference. The mean of the control scores obtained during the first half of the subjects' observed
contractions and the second half of their observed contractions resulted in a $t$-test of $T = 2.34$ ($n = 16 \text{ subjects}$) for a $p$ value of $< .05$, and the mean of the experimental scores obtained during the first half of the subjects' observed contractions and the second half of their observed contractions resulted in $T = 3.88$ ($n = 16 \text{ subjects}$) for a $p$ value of $< .01$.

The mean of the control scores and experimental scores during the first half of observations (labor) revealed a $T = 2.5$ ($n = 16 \text{ subjects}$) for a $p$ value of $< .05$. There was no significant difference in the second half of labor between the control and experimental scores. The lack of significant difference could be due to recording error because blood pressure readings were always taken after all other measurements had been completed.

The range of the diastolic blood pressure scores for the 18 subjects was 65-100 mm Hg, with the range of means 69-96.6 mm Hg. The mean diastolic blood pressure for all the means was 83.9. The mean score for all the experimental means was 83.3. The mean score for all the control means was 84.2.

There was no significant difference in $t$-tests for related measures between the mean of the total number of experimental scores and the mean of the total number of control scores; the mean of the control scores obtained during the first half of the subjects' observed contractions and the second half of their observed contractions; or the means of the control scores and experimental scores during the first and second half of observations (labor).
Skin Temperature Scale

The total number of evaluations (baseline and following every fifth contraction) equaled 139 for 16 subjects (two subjects' readings were omitted due to machine failure). There was a range of 3 to 18 observations with a mean of 9.2 observations per subject and a standard deviation of ±4.6. There is no comparison with previous studies as none of the researchers mentioned previously used the skin temperature measurement.

Selkurt (1976) states:

It is difficult to specify one temperature as normal since body temperature varies considerably between individuals. In one study, rectal temperature in a group of healthy subjects varied from 34.2° to 37.6° C. with a mean of 36.9° C. Skin temperature, unlike deep body temperature, shows considerable variations between areas and with changes in atmospheric temperatures. (p. 677)

According to Selkurt (1976), mean skin temperature for the average person at a comfortable room temperature (24° to 25° C.) is about 33°C. Surfaces covering the areas of high resting heat production have the highest skin temperatures (34.6°C.). Surfaces covering the large muscle masses of the arms and legs have a mean temperature of 30.8°C., and areas that cover very little muscle (hands and feet) have the lowest mean resting skin temperature, 28.6°C. Skin temperature may fluctuate ± 10° to 12°C. around its normal mean without damage.

In this study, the range of scores was 24.7°C. to 35.9°C. with the range of means 26.1°C. to 35.7°C. The mean skin temperature for all the means was 30.4°C. The mean score for all the experimental means was 30.09. The mean score for all the control means was 30.50. Skin temperature score variability ranged from 24.7°C. to
35.9°C. at a constant room temperature of 75°F. (23.8°C.). Variation within patients was analyzed to identify fluctuation due to increased energy expenditure. There was no significant difference in t-tests for related measures between the mean of total number of experimental scores and the mean of the total number of control scores; the mean of the control scores obtained during the first half of the subjects' observed contractions and the second half of their observed contractions; or the mean of the control scores and experimental scores during the first and second half of observations (labor).

There were several possible reasons for this occurrence:

1. placement of the electrodes (according to patient's request i.e., placing electrodes under the sole of the foot or placing it on the inner side of the leg).

2. disattachment of electrodes (due to patient's request to go to bathroom, which might have had a cooling effect on the patient's leg and the electrode).

3. exposure of the patient's skin (due to doctor's or nursing staff's examination, which might have had a cooling effect on the patient's skin temperature).

Galvanic Skin Response

The total number of evaluations (baseline and following every fifth contraction) equaled 152 for 17 subjects. One subject refused to put the strap around her fingers. There were 7 missing GSR readings for the total recorded of 145 observations. There was a range of 3 to 18 observations with a mean of 9.2 observations per subject and a standard deviation of ±4.6.
There is no comparison with previous studies as none of the researchers mentioned previously used the Galvanic Skin Response measurement.

According to Geddes (1975):

McLendon and Hemingway (1930) observed that the GSR measured by dc resistance change was 45 times larger than the impedance change measured at 1.5 MH. . . . Forbes and Landis (1935) were able to detect the GSR in a few subjects. They pointed out, however, that there were gross individual differences. In some subjects the upper frequency was 1 kHA. Both Forbes (1936) and Montagu (1958) found a good correspondence between the potential change (endosomatic signal) and the impedance change in the low frequency region below 100 Hz. Nichols and Daroge (1955), Tolles and Carberry (1959), and Taylor (1962) called attention to the advantages of using alternating current in minimizing electrode polarization problems in detecting the GSR. Nichols and Daroge employed 60 Hz. Tolles and Carberry used 5 Hz. and Taylor used 65 Hz. Nichols and Daroge stated that the amplitude of the GSR decreased with increasing frequency and that there is little response with frequencies above 1 kHz. At 60 Hz. they found the response to be half that which is measured when using direct current. A similar decrease in the amplitude of the impedance change with increasing frequency was reported by Yokota and Fujimori (1962). More research must be carried out to correlate the effect of frequency on the impedance change with the resistive and voltaic components of the GSR. Because of the low frequency of the GSR signal, high-gain direct-coupled amplifiers are traditionally used, and drift has frequently been a problem. If the exosomatic component of the GSR can be adequately measured with alternating current, carrier amplifiers can be used to provide high stability and a high signal-to-noise ratio. (p. 390)

In this study the range of scores was 0.0 to 6.89 with the range of means 0.01 to 3.0. The mean GSR for all the means was 0.45. The mean score for all the experimental means was 0.42. The mean score for all the control means was 0.48. The t-test for related measures between the mean of total number of experimental scores and the mean of the total number of control scores indicated a T score
of 2.33 with a p value of < .05. The mean of the control scores obtained during the first half of the subjects' observed contractions and the second half of their observed contractions showed no significant difference (NS). The mean of the Experimental scores during the first half of the subjects' observed contractions and the second half of their observed contractions showed no significant difference (NS). The mean of the first half of the control scores versus the first half of the experimental scores showed no significant difference (NS). The mean of the second half of the control scores versus the second half of the experimental scores revealed a T score of 2.1 with a p value of < .05.

Effects of Medication

In comparing medication with behavioral, pulse, blood pressure (systolic and diastolic), Galvanic skin response and skin temperature scores, the following was done:

a. the mean scores for each of the above measures of each subject were rank ordered and the highest nine subjects were grouped (Group A).

b. the lowest nine ranking subjects were grouped as above (Group B).

c. an arbitrary "pharmaceutical relief score" was devised:

Nisentil + 5 (per dose)
Paracervical block + 10 (per dose)
Pudendal + 10 (per dose)
Both paracervical and pudendal at one time + 10 (per combination dose)
Buccal pitocin - 5 (per dose)
Intervenous pitocin - 5 (per dose)
The total medication was summed for a medication score.
d. An independent t-test was computed for the mean medication score for Group A versus Group B for each measure.

Table 5
COMPARISON OF MEDICATION SCORES WITH THE SIX READING SCALES BETWEEN GROUPS A AND B

<table>
<thead>
<tr>
<th>Medication score compared with:</th>
<th>Group A (lowest scores)</th>
<th>Group B (highest scores)</th>
<th>T-score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral Score</td>
<td>8.9</td>
<td>13.9</td>
<td>-1.40</td>
</tr>
<tr>
<td>Pulse</td>
<td>12.2</td>
<td>8.9</td>
<td>0.89</td>
</tr>
<tr>
<td>Blood pressure (systolic)</td>
<td>8.3</td>
<td>14.4</td>
<td>-1.50</td>
</tr>
<tr>
<td>Blood pressure (diastolic)</td>
<td>8.3</td>
<td>14.4</td>
<td>-1.50</td>
</tr>
<tr>
<td>Galvanic skin response</td>
<td>11.1</td>
<td>10.6</td>
<td>0.02</td>
</tr>
<tr>
<td>Skin temperature</td>
<td>13.7</td>
<td>9.3</td>
<td>1.20</td>
</tr>
</tbody>
</table>

Medication scores compared with behavioral scores, pulse, blood pressure systolic, blood pressure diastolic, Galvanic skin response and skin temperature showed no significant difference. Therefore, medication did not seem to contribute to either the high or low scores. Although
lower-scored persons improved their scores during experimental treatment as labor progressed, there does seem to be no difference in persons also, unrelated to their medication or experimental treatment, in which some are at lower levels than others.

**Electromyograph Scale**

The first day of the research, after recording the data projected by the frequency counter and examining the relationship of the patient's psychological and physiological state, it was determined that there was no correlation between what the patient was experiencing and what the frequency counter was recording. For example, when the patient squeezed her fingers and toes instead of showing a high score it showed low and highly variable numbers. In spite of further attempts to adjust the machine, it remained inaccurate. Therefore, as the EMG was not functioning accurately and also had proved itself to be uncomfortable for the patient, it was decided to omit the EMG from the protocol on the advice of the Thesis Committee.

In conclusion, the researcher felt it important to mention one particular situation encountered during the research. A woman, very well dressed and meticulously made-up and coiffeured, undergoing medical induction (the continual administration of medicine promoting stronger and more frequent contractions), accepted the researcher's proposal, after discussion with both the mother and her husband. This acceptance was conditional; the patient knew she could interrupt or stop the treatment at any time. After initiation of facial massage, and the inevitable disarrangement of her hair, the patient insisted that she did not wish
to continue participation in the research. Her refusal seemed to have been due primarily to concern over the maintenance of her make-up.

In view of the nature of the patient's objections, and of her high suitability for the research at hand, the researcher temporarily stopped treatment and reassured the patient by promising to return in two hours, or whenever the patient should require help. Upon returning after the two-hour period, the researcher observed that both the woman and her husband were angry and frustrated. They felt helpless in the face of increasing contractions; they would accept neither medication nor the researcher's treatments.

The massage procedure, and its relation to muscle-tension in the patient's heavily made-up face, was explained to the patient and her husband in order to give both a sense of security. The patient was assured that her appearance would not be adversely affected by the treatment, and again, that the treatment could be terminated whenever she wished. Subsequent to these explanations, the husband was encouraged to go for dinner--a very important step, since the woman was very dependent upon her husband, and overly concerned about impressing him. The researcher then started the treatment by: (1) positioning the patient; (2) rearranging her hair and partially removing her make-up (leaving the eye make-up), in order to achieve a relaxed facial expression; and (3) continuing with ordinary protocol, augmented by much verbal explanation and reaffirmation of the patient's progress.

At first the patient was very tense and remained in a sitting position, anxiously observing the procedures. She gradually relaxed, until finally she lay on her back, eyes closed, arms relaxed, and
breathing correctly. The patient's maximum relaxation was evident, not
only because of her appearance, but also as shown by the GSR. She
appeared so relaxed, in fact, that her husband upon returning to the
labor room, mistook her condition as having been caused by medication
and protested angrily. Explanation of the treatment and of the read-
ings on the monitors, however, pleased the husband greatly. He himself
became involved in the treatment, which was continued successfully.
Therefore, the original contradictory desires of the patient and her
husband (i.e., the absence of medication, but comfortable labor never-
theless) were fulfilled.

After successful delivery, the husband returned to the researcher
and expressed his sincere gratitude for her patience, assertiveness, and
sensitivity towards his wife's needs, in spite of the couple's initial
rejection of the researcher's proposal.
Table 6

COMPARISON OF MEANS, RANGE OF MEANS AND SCORES, STANDARD DEVIATIONS OF VITAL SIGNS, GSR, SKIN TEMPERATURE, AND BEHAVIORAL SCORES IN TERMS OF NUMBER OF CASES, OBSERVATIONS AND MISSING DATA

<table>
<thead>
<tr>
<th></th>
<th>Total No. of Observations</th>
<th>No. of Missing Observations</th>
<th>No. of Cases</th>
<th>Range of Scores</th>
<th>Range of Means</th>
<th>Overall Mean</th>
<th>S.D.</th>
<th>Experimental Mean</th>
<th>Control Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral Score (^a)</td>
<td>157</td>
<td>10</td>
<td>18</td>
<td>0-10</td>
<td>3.4-10</td>
<td>8.00</td>
<td>2.00</td>
<td>8.8</td>
<td>7.3</td>
</tr>
<tr>
<td>Galvanic Skin Response (^b)</td>
<td>152</td>
<td>7</td>
<td>17</td>
<td>0.0-6.89</td>
<td>0.01-3.0</td>
<td>0.45</td>
<td>0.74</td>
<td>0.42</td>
<td>0.48</td>
</tr>
<tr>
<td>Blood press. systolic</td>
<td>141</td>
<td>26</td>
<td>18</td>
<td>105-160</td>
<td>113-153.3</td>
<td>126.2</td>
<td>100.80</td>
<td>126.5</td>
<td>127.4</td>
</tr>
<tr>
<td>Blood press. diastolic</td>
<td>141</td>
<td>26</td>
<td>18</td>
<td>65-100</td>
<td>69-96.6</td>
<td>83.9</td>
<td>7.08</td>
<td>83.3</td>
<td>84.2</td>
</tr>
<tr>
<td>Pulse</td>
<td>150</td>
<td>17</td>
<td>18</td>
<td>60-112</td>
<td>65.3-98.5</td>
<td>83.7</td>
<td>69.80</td>
<td>83.3</td>
<td>80.0</td>
</tr>
<tr>
<td>Skin temperature</td>
<td>139</td>
<td>29</td>
<td>16</td>
<td>24.7-35.9</td>
<td>26.1-35.7</td>
<td>30.4</td>
<td>3.10</td>
<td>30.0</td>
<td>30.5</td>
</tr>
</tbody>
</table>

\(^a\)Scale of 0 to 10; 10 equals best response.

\(^b\)Scale of 0 upward; 0 equals best response.
Table 7

T-VALUES FOR LEVELS OF SIGNIFICANCE, COMPARING VITAL SIGNS, SKIN TEMPERATURE, GSR, AND BEHAVIORAL SCORES DURING CONTROL AND EXPERIMENTAL TREATMENT IN LABOR

<table>
<thead>
<tr>
<th>Behavioral Score</th>
<th>Galvanic Skin Response</th>
<th>Blood Pressure</th>
<th>Skin Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The T-test for related measures between:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Mean of total number of experimental scores and mean of total number of control scores</td>
<td>( T = 5.94 )</td>
<td>( T = 2.33 )</td>
<td>NS</td>
</tr>
<tr>
<td>( p &lt; .001 )</td>
<td>( p &lt; .05 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Mean of control scores during first half of subjects' observed contractions and second half of their observed contractions</td>
<td>( T = -4.99 )</td>
<td>NS</td>
<td>( T = 2.34 )</td>
</tr>
<tr>
<td>( p &lt; .001 )</td>
<td>( p &lt; .05 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Mean of the experimental scores during first half of subjects' observed contractions and second half of their observed contractions</td>
<td>( T = -3.61 )</td>
<td>NS</td>
<td>( T = 3.88 )</td>
</tr>
<tr>
<td>( p &lt; .01 )</td>
<td>( p &lt; .01 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Mean of first half of control scores versus first half of experimental scores</td>
<td>NS</td>
<td>( T = 2.5 )</td>
<td>NS</td>
</tr>
<tr>
<td>( p &lt; .05 )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Mean of second half of control scores versus second half of experimental scores</td>
<td>( T = 2.1 )</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>( p &lt; .05 )</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
An experimental study was conducted at St. Mark's Hospital in Salt Lake City, Utah to evaluate the effect of nursing intervention, specifically, controlled breathing and supportive physical touch, upon women's responses to their labor contractions. The study also involved further development and use of tools for measuring responses of women to their labor contractions. The sample included behavioral and physiological data for eighteen patients during labor. The subjects included five primigravidas and thirteen multigravidas.

It was hypothesized that there will be differences in pulse, blood pressure, skin temperature, Galvanic Skin Response, electromyogram and behavioral coping scores obtained during the last of a set of five contractions when experimental and control treatments were applied.

Each patient was used as her own control. The control treatment consisted of sets of five contractions, alternated with the experimental treatment, which also consisted of five contractions, in which the touch relaxation and controlled breathing was administered. Data were obtained at the end of each set of contractions. T-tests were done to compare the control and experimental groups.

The study showed no significant difference between the mean experiment and the mean control contraction for pulse and skin temperature.
The difference was significant for systolic blood pressure between the mean of control scores during the first half of the subjects' observed contractions and the second half of their observed contractions at the .05 level. The mean of the experimental scores during the first half of the subjects' observed contractions and the second half of their observed contractions was at the .01 level. The mean of the first half of the control scores versus the first half of the experimental scores was at the .05 level.

The difference was significant for Galvanic skin response between the mean of total number of experimental scores and the mean of the total number of control scores at the .05 level. The mean of the second half of the control scores versus the second half of the experiment was at the .05 level.

The difference was significant for behavioral score between the mean of total number of experimental scores and the mean of total number of control scores at the .001 level. The mean of control scores during the first half of the subjects' observed contractions and the second half of their observed contractions was at the .001 level.

The mean of the experimental scores during the first half of the subjects' observed contractions and the second half of their observed contractions was at the .01 level.

The behavioral scale was sensitive in that scores from 0 to 10 were observed. There were differences between individuals using the scale. For example, the baseline scores for the 18 subjects ranged from 0 to 10 and the last set of scores ranged from 4 to 10. There were also differences obtained between individuals indicating that the scale
was capable of identifying differences in response to changing the process of labor and/or the experimental treatments. For example, there were individuals whose scores changed over the course of labor from 3 to 10.

The mean behavioral score for this study was 8.00 and for previous studies 6.84 and 5.52. These scores are higher indicating good control and coping on the part of the subjects in the three studies. These high scores may be due to the fact that the environment, nursing care and preparation for childbirth were nearly optimal. It may be that in other populations of less well-prepared women, in less pleasant environmental surroundings, and reduced nursing care that the mean scores would be lower. There were low scores, however, in some individuals and some improved their scores while others did not. Therefore the full range from 0 to 10 seems possible during labor and the variables which influence scores need further study.

Possibly the most serious problem encountered during this study was its small sample size. Due to time constraints, the sample size was limited to 18 subjects.

The aforementioned summary of results must be viewed with the following factors in mind:

1. The patient, having learned to use the modalities employed by the researcher during the first sets of five contractions, may have employed these modalities on her own accord during the control treatment. As the experiment progressed, the patient continually augmented her knowledge of the experimental treatment to the point where she
might apply the treatment to herself, independent of the researcher. This, in fact, was observed in several cases.

2. As labor progressed, the amount of pain and stress increased. Readings on the various measurement tools would therefore be expected to rise accordingly. This, however, did not occur. Although statistics did not reveal a significant difference among all physiological reactions during control and experimental treatments, they at least showed that reactions remained stable.

3. The husbands of some patients applied experimental treatment (i.e., touch) during the control treatment. Therefore, this may have affected the research results as there should have been no treatment at all in that period of time.

4. The patients tested were all physiologically (i.e., blood pressure, pulse, etc.) normal, and psychologically prepared for childbirth, the latter due primarily to the patients' preparation for delivery through classes taken at the hospital in conjunction with this or a previous pregnancy. Implications are therefore that positive responses may well involve the combination of preparation before labor and support during labor.

5. Sometimes a conflict occurred when the woman expected treatment from her husband as outlined in the classes and he was unwilling or unable to supply it. In these cases, the husband generally had affection for his wife, but was simply not capable of expressing his feelings and concerns through the specific modalities she had been led to expect through her previous training in the classes. Therefore, an
implication for class instruction might be more emphasis on assisting the father to prepare more adequately for his coaching role.

6. Often the use of medication with specific individuals was a confounding variable. The patient would sometimes request medication without any apparent need or knowledge of it based on an expectation that she should have it or the staff sometimes administered the medication as part of a routine rather than according to patient request.

7. Results obtained during experimental treatment were sometimes adversely affected by a simultaneous vaginal examination. These examinations were done somewhat routinely and frequently unrelated to other signs of labor progress.

8. Initial anxiety levels of the patients were, in general, very low. This fact can be attributed to the calm, relaxing physical atmosphere at St. Mark's Hospital (i.e., the architectural design, choice of colors, and arrangement and color-coordination of the furniture within the hospital). More importantly, hospital staff seemed to be exceptionally courteous and cheerful.

9. The researcher's familiarization with the hospital building and staff, two days prior to initiation of experimentation, lent the researcher a feeling of calmness and security. This was later communicated to the patient and somewhat alleviated the patient's initial feelings of anxiety concerning the request to participate in an experiment.

10. Results may have been more accurate if readings had been taken during the peak of contractions. This was, however, not done, in view of the discomfort experienced by the patient at this time.
(This type of measurement would have been possible with proper monitoring equipment for blood pressure and pulse, similar to the GSR.) Furthermore, blood pressure and pulse readings were always taken after all other measurements (i.e., psychological-behavioral tools, fetal monitor, GSR, and skin temperature) had been completed. At this time, the patient was either already thoroughly relaxed again or on the verge of another contraction.

11. Data may have been affected by the fact that patients were more receptive to treatment during the night than in the day. The researcher experienced no refusal of treatment at night, while there were some refusals during the day.

**Recommendations**

1. It would be advantageous to use one monitor that could perform all the functions normally assumed by the GSR, the temperature machine, and the counter and amplifier machines, as well as those done by the nurse, such as the measurement of pulse and blood pressure. One monitor would take up less space and would therefore render the working space more convenient for all involved--the researcher, the nursing staff, and the patient. The existence of only one machine would also eliminate the possible hazards encountered when machines are stacked on top of each other, as was done by the researcher in order to conserve space. Finally, readings may be more accurate when all functions are performed by one machine. The transfer of heat or electrical current between different machines and the extra time needed when each procedure occurs separately may be detrimental to the efficiency of the
treatment, and, ultimately, to the accuracy of the readings.

2. The prior arrangement of an automatic camera in order to photograph the patient as the treatment progresses would greatly benefit the accuracy of the behavioral score and would document the observations made by the researcher.

3. The existence of an experimental group and a control group, rather than just one group to serve in both capacities might be beneficial. This division of the two groups would prevent the problem of carry-over. Furthermore, the research on medication effects would be facilitated. However, this design would not allow control for normal variations between subjects of certain of the physiological variables.

4. Use of the graphic fetal monitor would enable the researcher to keep a more accurate, documented record of the various levels of pain experienced during labor. This record of pain levels could be studied in comparison with the patient's level of tolerance as measured by the camera and other equipment.

5. A control group and an experimental group could further be used in conjunction with a study based on reward and conditioning (i.e., the administration of ice chips when the patient performs well, and the withholding of ice when she does not perform). This type of conditioning occurred spontaneously in certain phases of the research. One woman would await a piece of ice with eyes closed and mouth opened after she had followed the researcher's instruction well.

6. A study of the effects of the voice on labor pain could be set up by using the previously taped voice of a person speaking in soothing tones and in a calming manner. One group of patients would
receive touch treatment from the person whose voice is on the tape, while simultaneously listening to the tape; a second group would be given the treatment only.

7. The "touch" treatment could be further studied by again dividing the patients into two groups. The first group would receive treatment from the nurse, while the second would be treated by the previously-trained husbands.

8. In order to make a cross-cultural study, it would be helpful to study each cultural group and how it reacts to pain within its own country, in comparison with each group's behavior when subjected to treatment in a foreign country.

9. A study dealing with two groups: (1) normal patients and (2) high-risk patients (suffering from either psychological and/or physiological problems) may be helpful in determining the real effectiveness of the treatment used.

In summary, the behavioral tool was easy to use and sensitive in obtaining variations in response. It should be useful as a dependent measure in future studies. The other tools need further study in relation to timing of use and accuracy of instrumentation before they can be considered valid and reliable. However, the range in scores as well as their apparent consistency in measuring the various physiological changes indicates their potential usefulness as the problems with their utilization are resolved. There is need for further development of bio-instrumentation which is convenient and accurate for the clinical setting. Simultaneous recordings of all physiological measures would greatly enhance the value of the data obtained.
REFERENCES


Cameron, Joyce. University of Utah, class outline, 1978.


## APPENDIX A

### STURROCK LABOR COPING TOOL SCORING CHART

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vocal Response</strong></td>
<td>No disturbed sound; patterned sound (hum, heavy breath, conversation)</td>
<td>Whispered, moaned, groaned or grunted, but not loud crying</td>
<td>Screamed or cried aloud</td>
</tr>
<tr>
<td><strong>Physical Response</strong></td>
<td>None, quiet, relaxed, purposeful movement or random movement</td>
<td>Regional movement or rigidity of single or several body parts</td>
<td>Entire body either grossly active or rigid</td>
</tr>
<tr>
<td><strong>Breathing Response</strong></td>
<td>Controlled breathing throughout contraction</td>
<td>Controlled breathing through part of contraction, some effort to control</td>
<td>Uncontrolled breathing, no attempt at control</td>
</tr>
<tr>
<td><strong>Facial Expression</strong></td>
<td>Facial muscles generally relaxed or smooth</td>
<td>Squeezes eyelids, grimaces or winces during part or all of contraction</td>
<td>Face contorted</td>
</tr>
<tr>
<td><strong>Verbal Response</strong></td>
<td>Expressions which signify ability to cope or an anticipation or assumption of progress</td>
<td>Expression of complaint with resignation to it or possible alleviations of the discomfort</td>
<td>Keynote of the expression is hopelessness and inability to cope with the contractions of labor</td>
</tr>
</tbody>
</table>
APPENDIX B

LABOR RECORD SHEET

Name ___________________________ Age _____ Parity _____ Race ______

EDC __________________________ Date admitted _______________ Time ____

Date observation begun ___________________ Time _____

Date observation completed ___________________ Time _____

Date of onset of labor ___________________ Time _____

Length of 1st stage _____ Length of 2nd stage _____ Total _____

Complications or special comments:

__________________________________________

__________________________________________

__________________________________________

Record the last of a series of 5 contractions ________ C E C E C E C E C

Time (24 hr. clock)

Pulse

Blood pressure

Temperature

GSR

EMG
<table>
<thead>
<tr>
<th>Record the last of a series of 5 contractions</th>
<th>C</th>
<th>E</th>
<th>C</th>
<th>E</th>
<th>C</th>
<th>E</th>
<th>C</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time (24 hr. clock)</strong></td>
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<tr>
<td>Screamed or cried aloud (0)</td>
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<tr>
<td>Moaned, groaned, whimpered or grunted (1)</td>
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<tr>
<td>No sound or patterned sound (hum, heavy breath, conversation) (2)</td>
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<tr>
<td><strong>Physical Response</strong></td>
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<td>Entire body either grossly rigid or active (0)</td>
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<tr>
<td>Regional, repetitive or random movement, or rigidity of single or several body parts (1)</td>
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<td>Purposeful movement or single random movement (2)</td>
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<td>No breath control (0)</td>
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<tr>
<td>Natural or controlled breathing with part of contraction (1)</td>
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<td>Natural or controlled breathing throughout contractions (2)</td>
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<tr>
<td><strong>Facial Expression Response</strong></td>
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<td>Face contorted (0)</td>
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<td>Squeezed eyelids, grimace or wince (1)</td>
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<td>Facial muscles generally relaxed or smooth (2)</td>
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<td><strong>Verbal Response</strong></td>
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<td>Negative (0)</td>
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<tr>
<td>Neutral (1)</td>
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<td>Positive (How was that one?) (2)</td>
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<tr>
<td>Record the last of a series of 5 contractions</td>
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<td>Time (24 hr. clock)</td>
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<td>Duration of contraction</td>
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<td>Intensity (mi, mod, st)</td>
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<td>Dilation</td>
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<td>Effacement</td>
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<td>Abdominal (a)</td>
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<td>Scalp (S)</td>
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<td>Doppler (D)</td>
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<td>Fetzscope (F)</td>
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<td>Induction</td>
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<td>Oxytocics</td>
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<td>Amnionomy</td>
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<tr>
<td>*Medication (#1, 2, 3, etc.)</td>
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<td>Father touching</td>
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<td>Other staff touching</td>
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<td>Nursing measures (cool cloth, pad changed, etc.)</td>
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<td>Researcher assisted/encouraged</td>
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<td>controlled breathing</td>
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<td>Father assisted/encouraged</td>
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<td>Mother controlled breathing</td>
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<td>Other assisted/encouraged</td>
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</table>

*Medications: |

1. |

2. |

3. |

4. |

5. |
APPENDIX C

EXPLANATION OF STUDY

As a state-certified midwife from England, a graduate student at the College of Nursing, University of Utah, and of Iranian nationality, I am very interested in studying the effects of uterine contractions and how to help women cope with them during labor.

Therefore, I am doing a research project concerning the effects of supportive nursing care, including periodically:

1. Encouraging the use of controlled breathing during contractions (either methods you have learned and are using, or, if you have learned none, ones I will suggest to you).

2. Applying supportive physical touch to your arms or legs to remind you to relax your muscles.

The following information will be obtained during and at the conclusion of every fifth contraction:

1. blood pressure and pulse
2. response to the contraction
3. tests of skin electrical resistance and temperature and muscle tension which will be obtained by placing a sensor around your middle finger for about five minutes every fifth contraction.

In addition, the following information will be extracted from your chart: age, parity, due date, length of labor, complications and infant apgar score.
Benefits

In exchange for your permission to carry out the procedures described above, I will provide direct nursing care during your labor, remaining with you and your support person to assist you to have the most comfortable experience possible under the supervision of your doctor and the staff nurses. The study will provide future benefits to mothers through identifying the best supportive measures to be taken by nurses during labor.

Risks

There are no risks or dangers involved. All electrical equipment will be used according to the manufacturer's specifications for safety. You will not experience any discomfort with any of the measurement tests.

This project is under the direction of a graduate faculty member at the University of Utah College of Nursing who is a certified Nurse-Midwife.

If you would be willing to participate in this study, please read the attached consent form and sign your name in the space indicated.

Thank you very much.

Farideh Farahbod
Graduate Nursing Student
University of Utah
College of Nursing
VITA

<table>
<thead>
<tr>
<th>Name</th>
<th>Farideh Farahbod</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birthplace</td>
<td>Tehran, Iran</td>
</tr>
<tr>
<td>Birthdate</td>
<td>March 5, 1945</td>
</tr>
<tr>
<td>High School</td>
<td>Shanas Pahlavi High School, Tehran, Iran</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Professional Schools</th>
<th>Princess Beatrice School of Nursing, London, England</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>State Registered Nurse Diploma, 1965</td>
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<tr>
<td></td>
<td>Epsom District School of Midwifery, Surrey, England</td>
</tr>
<tr>
<td></td>
<td>State Certified Midwife Diploma, 1967</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>University</th>
<th>University of Utah, Salt Lake City, Utah</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>B.S., Nursing, 1978</td>
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</tbody>
</table>

|------------------------|-----------------------------------------------------------------------------------------------|

Clinical Instructor in Obstetrical Nursing, Medical-Surgical Nursing, Public Health Nursing (one semester each) at various hospitals and clinics, Tehran, Iran, 1967-1970

Participant in educational program in medical-surgical, CCU, ICU, dialysis at Montreal General Hospital, Victoria General Hospital, and Montreal Children's Hospital, Canada, 1970-1971
Professional Positions (continued)

Senior faculty member in Obstetric Nursing, Comprehensive Nursing (CCU, ICU, dialysis in Burns Unit) in charge and active, one semester each, various hospitals, Tehran, Iran, 1971-1975

Places of activity with students:
Queen's Hospital for Burns
Pahlavi New Foundation Heart Center
Firoozgar Medical Center
Farah Maternity Hospital
Pars General Hospital
Mehr General Hospital
Nejat Health Clinic
Iaftabad Health Clinic
Kanoon Khier Khah General Hospital and Health Center Clinic
Iran, 1967-1975

Private and part-time experience as midwife or evening supervisor at:
Baher General Hospital
Namdaran General Hospital
Apadana General Hospital
Gam General Hospital
Tehran General Hospital
Iran, 1967-1975

Other Experience

Active participant in Family Planning Seminar at Ministry of Health
Tehran, Iran, 1969


Personal student advisor at High Institute of Nursing, also active in various student committees as an advisor, especially Art Committee
Iran, 1971-1975

Member, Iranian Nurses' Association, 1971-1975

Helping and leading patients and fourteen students in Farse earthquake disaster for two weeks
Iran, 1972
Other Experience (continued)

In charge of in-service education program for faculty members of College of Nursing at Esfahan University, Iran, 1973 (3 months)

Honors

B.S. Degree with Honors (cum laude) University of Utah, 1978

Initiated to Alpha Lambda Delta University of Utah, July 1976

Initiated to Phi Eta Sigma, Freshman Honor Society, 1976

Honor Letter from Iranian Prime Minister and Ministry of Health and Managing Director of F.M. Center for being leader of a group of students in the 1972 Farse earthquake disaster

Letter of thanks from Managing Director of F.M. Center for good performance as Group Coordinator Medical-Surgical Nursing II, 1971

Received Tutor's Prize for consistent effort and study London, England, 1965

Received Natural Science diploma with Honors from high school, Iran, 1961

Awards

One-year scholarship to Montreal, Canada from World Health Organization 1970-1971

Two-and-a-half-year scholarship to University of Utah from World Health Organization 1975-1977