THE RESPONSES OF NEWBORN INFANTS TO TACTILE STIMULATION PROVIDED BY NURSES

by

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The problem considered in this study was: Does tactile stimulation which nursing personnel provide produce positive responses in newborn infants? A review of the literature indicated that the infant is born with physical and emotional needs which must be fulfilled in order for the infant to develop into a healthy adult. One of these emotional needs is stimulation from the environment and from other human beings. This stimulation is communicated to the infant through his senses, of which the sense of touch is the most highly developed at birth. Thus, the first impressions which a newborn receives is through the sense of touch. The nurse is frequently one of the few persons having opportunity for contact with the newborn infant, and it is the responsibility of the nurse to use the most effective means of communicating with the infant. This is the sense of touch.

The hypothesis tested in this study was: The greater the amount of nursing time devoted to providing tactile stimulation to newborn infants, the greater the positive responses of the infants.

The independent variable, tactile stimulation, was

categorized into bodily contact, which included holding and/or cuddling, and into touching. The dependent variable, positive responses, was defined as the onset of cessation of crying, elimination of frowning, and/or observable muscular relaxation. The investigator observed and recorded in seconds the tactile stimulation which nursing personnel provided the infants. The responses of the infants were then observed and recorded in seconds. This procedure was done the afternoon of the first day after birth from one o'clock to three o'clock and was repeated the following three days.

A convenience sample of newborn infants at Colorado General Hospital was selected for observation. All the infants were being relinquished by the mothers and were in good physical condition. Each infant was at least twelve hours of age at the time of the first observation and not more than ninety-six hours at the time of the final observation.

Correlation of coefficient, r^2, was used to determine the relationship between bodily contact and positive responses and between touch and positive responses. A correlation of 0.59 was obtained between bodily contact and positive responses with a percentage reduction in error of 35%. The correlation, r, between touch and positive responses was 0.24 with a percentage reduction in error of 6%.

The relation between bodily contact and positive responses was interpreted as being a moderate one, and the relation between touch and positive responses was a very slight one. Therefore, the hypothesis was moderately supported when bodily contact was the form of tactile stimulation provided the newborn infants by nursing personnel, but was not supported when touch was the form of tactile stimulation.

Considering the results and limitations of the study, it was concluded that there was a moderate relationship between bodily contact given newborn infants by nursing personnel and the positive responses of the infants. There was only a slight relationship between touch given newborn infants by nursing personnel and the positive responses of the infants. Bodily contact given newborn infants by nursing personnel had more effect on positive responses than touch.

This abstract is approved as to form and content.

Signed Maxine R. Berlinger
Faculty member in charge of thesis

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CHAPTER I

THE PROBLEM, REVIEW OF LITERATURE AND DEFINITIONS OF TERMS USED

Modern research has shown that the human newborn infant is much more sensitive to the effects of his environment than was previously thought, and much has been written concerning sensory perception of infants and effective communication in nursing. However, little research is available concerning the responses of infants to nursing care, especially the responses to specific sensory stimulation provided by the nurse.

I. THE PROBLEM

Statement of the problem. The problem considered in this study was as follows: does tactile stimulation which nursing personnel provide produce positive responses in newborn infants?

Importance of the study. The infant is born with certain hereditary characteristics, such as physical make-up and the basic elements for development of intelligence. In addition, a "potential personality" is present, which develops as the individual interacts with his environment.[1]

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[1]Gordon Allport, Pattern and Growth in Personality (New York: Holt, Rinehart, and Winston, 1965), p. 57.

Through this interaction with the environment, the conditions necessary for physical maturation and personality development are satisfied.

In order for the infant to survive and to develop into a physically and psychologically healthy adult, his needs must be fulfilled.[2] These needs include physical ones, such as the needs for food, water, warmth, and safety, and emotional needs, such as love, acceptance, and stimulation.[3] The results of deprivation of the latter needs are dramatically illustrated among institutionalized infants, who suffer from no detectable physical disease or physical deprivation, but who fail to thrive.[4] This failure to develop both physically and emotionally is now attributed to a lack of "mothering." The infants fail to receive needed stimulation from the environment and from other human beings. Stimulation is communicated to the infant through the senses, and the sense of touch is the most highly developed at birth. Therefore, the first impressions

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[2]Florence Blake, The Child, His Parents and the Nurse (Philadelphia: J. B. Lippincott Company, 1954), p. 54.

[3]Ibid., p. 62.

[4]James C. Coleman, Abnormal Psychology and Modern Life (Chicago: Scott, Foresman and Company, 1964), p. 130.

an infant receives are through the sense of touch.[5]

II. REVIEW OF THE LITERATURE

The human infant is helpless and is in need of careful nurturance from the moment of birth until the time at which physical strength and growth allows him to function independently.[6] The birth process represents a separation from the mother and a termination of a highly dependent relationship.[7] Before birth the infant is protected, and the first cry is an indication of the care and support needed to protect him after birth. Physiological needs are present in the infant, and he cannot fulfill these needs by himself. Warmth and food must be provided for the newborn if he is to survive.[8] In addition to the physical needs, emotional needs are present in the newborn; these needs include love, acceptance, security and stimulation.[9]

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[5]Phillip C. Jeans, F. Howell Wright, and Florence G. Blake, Essentials of Pediatrics (Philadelphia: J. B. Lippincott Company, 1958), p. 58.

[6]Florence Blake, loc. cit.

[7]Phillip C. Jeans, F. Howell Wright, and Florence G. Blake, op. cit., p. 53.

[8]Ibid., p. 54.

[9]Hedley Dimock, The Child in Hospital (Philadelphia: F. A. Davis Company, 1960), p. 23.

In order to transmit these needs to others, the newborn must rely on expression of emotion since this is present, and the ability to speak or to voluntarily signal does not develop until much later. The overt behaviors of these emotions are usually crying, frowning, and muscular tension; satisfaction of the needs is usually indicated by a cessation of crying, a decrease in frowning, and muscular relaxation, followed by sleep.

The sense organs through which the infant receives stimuli are present at birth, but are not mature; thus, the functions which they can perform are limited.[10] The sense of touch is the most highly developed and is also the most extensive, since stimuli are received from all parts of the body. The infant's first impressions are transmitted to him through touch, which is well developed by three months of age.[11]

The sense of sight is the slowest to develop, for maturation is required for muscle control. At birth the eyes cannot fix on an object, and the infant reacts only vaguely to a moving light.[12] Robert Fantz conducted an

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[10]Andrew McGhie, Psychology as Applied to Nursing (Edinburgh: E. and S. Livingstone Ltd., 1966), p. 3.

[11]Phillip C. Jeans, F. Howell Wright, and Florence G. Blake, op. cit., p. 58.

[12]Phillip C. Jeans, F. Howell Wright, and Florence G. Blake, loc. cit.

experiment with eighteen infants and found that they reacted with interest to complex patterns and to the human face.[13] However, most authors agree that visual recognition of the caretaker occurs at four to six months, but the sense of sight is not fully mature until eight or nine years of age. Hearing in terms of response to sounds appears shortly after birth, and association of sounds with their meanings does not occur until the second or third month after birth.[14] The senses of taste and smell are closely related in infancy; taste is slow to develop, and the infant is usually indifferent. The sense of smell is present at birth, and it increases in acuteness during the pre-school years.[15]

The importance of sensory stimulation for the infant has been studied extensively, for sensory input is the first contact with reality. Schaffer identified the first state of "attachment" behavior as a need for sensory stimulation in the form of tactile stimulation by other persons. As the nervous system develops, other senses become increasingly

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[13] Robert L. Fantz, "Patterned Vision in Newborn Infants" Science, 140:297, April, 1963.

[14] Phillip C. Jeans, F. Howell Wright, and Florence G. Blake, op. cit., p. 59.

[15] Ibid., p. 60.

important.[16] Stimulation is essential for the development of a healthy personality, for at birth the infant has no concept of himself. William James described the early thoughts of an infant as "big, blooming, buzzing, confusion."[17] Piaget, who has done studies on infant perception, identified the infant as being in a state of 'adualism' in which there is no difference between the self and others and no recognition of the world.[18] Only experience can teach the infant to distinguish himself from the world, and this experience is provided through stimulation. The infant responds to stimulation from other persons and reacts, thus forming attitudes about himself and others. This is the beginning of personality growth. Emotional responses and feelings are associated with this early stimulation. If the infant's early needs are repeatedly satisfied as stimulation is provided, feelings of security develop. Self-confidence is formed, and this will later project to optimistic feelings toward the world. The fulfillment of needs

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[16] H. R. Schaffer, "Some Issues for Research in the Study of Attachment Behavior", Determinants of Infant Behavior II (New York: John Wiley & Sons, Inc., 1963), p. 195.

[17] William James, The Principles of Psychology, (New York: Henry Holt and Company, 1890), p. 8.

[18] Jean Piaget, On the Development of Memory and Identity (Barre, Massachusetts: Clarke University Press and Barre Publishers, 1968), p. 29.

not only results in self-preservation, but in pleasure and in the ability to form relationships with other persons. Because the sense of touch is the primary means of receiving stimulation during the first three months, it is through holding, cuddling, and touching that a basic sense of trust is fostered. "Stimulation that is adjusted to the child's capacity to use it for growth is ego-supporting."[19]

Sensory deprivation frequently causes a defective personality to develop, for the necessary contact with reality is not present. Early emotional needs are not fulfilled and tension increases in the infant. Repeated frustration results in feelings of hopelessness and in decreased demands. Goldfare found that infants who have had few experiences with people and with the environment have no identifications and relations with people later in life. The ego-structure and concept formation are immature, and emotional apathy is present.[20]

Numerous experimental studies have been done concerning the effects of sensory deprivation on animals. Thompson and Heron conducted an experiment using twenty-six

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[19]Phillip C. Jeans, F. Howell Wright, and Florence G. Blake, op. cit., p. 57.

[20]William Goldfare, "Psychological Privation in Infancy and Subsequent Adjustment," American Journal of Orthopsychiatry, 15:254, 1945.

dogs, thirteen being raised as pets and thirteen being deprived of sensory stimulation. Results clearly indicated that a lack of experience caused decreased problem-solving ability, decreased adaptation, and disturbed thought processes, all of which appeared to be permanent.[21] Other investigators also found that sensory deprivation resulted in a lack of problem-solving ability in animals.[22]

Experimental studies have been done using adult humans as subjects. Visual hallucinations, sleeplessness, thinking difficulties, and restlessness were symptomatic of persons experiencing sensory deprivation.[23]

Hospitalized patients displayed similar symptoms when necessary therapeutic treatment limited sensory

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[21]William R. Thompson, and Woodburn Heron, "The Effects of Restricting Early Experience on the Problem-Solving Capacity of Dogs," Canadian Journal of Psychology, 8:29, 1954.

[22]Austin Reisen, Martin Kurke, Jeanne Cummins Mellinger, "Interocular Transfer of Habits Learned Mononucularly in Visually Naive and Visually Inexperienced Cats," Journal of Comparative and Physiological Psychology, 46:166, 1953; Seymour Leving, "The Effects of Differential Infantile Stimulation on Emotionality at Weaning," Canadian Journal of Psychology, 13:243, 1959; R.S. Clarke, et al., "Individual Differences in Dogs: Preliminary Report on the Effects of Early Experience," Canadian Journal of Psychology, 5:151, 1951; and Alexander Wolf, "The Dynamics of the Selective Inhibition of Specific Function in Neurosis," Psychosomatic Medicine, 5:36, 1943.

[23]Jack Vernon, Theodore Martin, and Ernest Peterson, "Sensory Deprivation and Hallucinations," Science, 133:812, June 2, 1961; and S. Smith and W. Lewty, "Perceptual Isolation Using a Silent Room," Lancet 2:345, September, 1959.

stimulation.[24] In a study of one five month old infant Margo McCaffery found that increased sensory input increased the behavior which the investigator defined as positive, while decreased sensory input decreased positive responses. This nurse investigator also found tactile stimuli to be most effective in producing positive responses, followed by visual and auditory stimuli, in this order.[25]

That knowledge of the effects of sensory deprivation is essential to nursing personnel is obvious; the patient's environment is limited, and the nurse is one of the few persons who has continuous exposure to the patient and who has the opportunity to communicate with the patient, thus providing sensory stimulation. For the newborn infant whose senses are not well developed the nurse is the person who usually has the most opportunities for contact and communication. Since the infant can receive communication best through the sense of touch, it may be important that

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[24] Jack Mendelson, Philip Soloman, and Erich Lindemann, "Hallucinations of Poliomyelitis Patients During Treatment in a Respirator," The Journal of Nervous and Mental Disease, 126:428, May, 1958; and Eugene Ziskind, et al., "Observations on Mental Symptoms in Eye Patched Patients: Hypnagogic Symptoms in Sensory Deprivation," The American Journal of Psychiatry, 116:893, 1960.

[25] Margo McCaffery, Disturbances in Sensory Input in Nursing Practice and Research, Ross Roundtable on Maternal and Child Nursing, Jeffries, J.E., ed., Columbus, Ross Laboratories, 1966, p. 42.

the nurse utilize this purposely. However, Ward found that nurses used bodily contact less frequently than any other means of interpersonal communication.[26] This fact merits investigation, for the nurse is a maintainance specialist; and any method which will facilitate communication with infants, thus relieving tension and providing needed stimulation, is a nursing function.

III. ASSUMPTIONS BASED ON DISCUSSED LITERATURE

1. The sense of touch is the most highly developed sense which the newborn infant possesses.
2. During the immediate period after birth stimulation to the newborn infant is primarily provided through the sense of touch.
3. In order for communication to be effective, it must be appropriate to the capacities of the recipient.
4. Nonverbal communication may be considered as reliable as verbal communication.
5. Communication to a newborn infant is most effective when the sense of touch is utilized.
6. Love, security, and stimulation during early infancy are essential for healthy personality development.

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[26]Janice Ann Ward, "Interpersonal Communication Behavior of Pediatric Nurses," (unpublished Master's thesis, The University of Colorado, Boulder, Colorado, 1965), p. 63.

7. Love and security can be communicated to the newborn infant through tactile stimulation, such as holding, cuddling and touching.
8. Tactile stimulation as a means of stimulation is an important force in producing positive responses, indicating the first steps in personality development.
9. The nurse is frequently in contact with the newborn infant for a greater length of time than any other person.

IV. HYPOTHESIS

The hypothesis tested in this study was: The greater the amount of nursing time devoted to providing tactile stimulation to newborn infants, the greater the positive responses of the infants.

V. DEFINITIONS

Nursing time. This was defined as the number of seconds involved in providing tactile stimulation by nursing personnel, including registered nurses, licensed practical nurses and nursing aides.

Tactile stimulation. This was defined as physical contact that was not associated with essential nursing or medical procedures, such as bathing, taking temperatures, and changing diapers. Tactile stimulation included holding,

cuddling and/or touching.

Newborn infant. These infants were defined as being between twelve and ninety-six hours of age.

Positive response. This was defined as the onset of cessation of crying, elimination of frowning,[27] and observable muscular relaxation. These behaviors were timed in seconds, and they were timed only until sleep occurred or until neutral or negative responses occurred.

Neutral response. This was defined as no change in behavior following tactile stimulation.

Negative response. This was defined as the onset of crying, frowning, and observable muscular rigidity.

VI. SUMMARY

A review of the literature indicated that stimulation is essential for physical and psychological development, and that stimulation is provided through the sense organs. In infants the sense of touch is the most mature; therefore, the most effective means of communicating to infants is by utilizing the sense of touch. Nursing personnel are frequently the persons having most opportunities for contact with newborn infants, and they, as maintainance specialists, should utilize any method which facilitates communication

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[27]Margo McCaffery, op. cit., p. 34.

with infants. This is the sense of touch.

The problem considered in this study was: Does tactile stimulation, which includes holding, cuddling and touching, which nursing personnel provide produce positive responses, defined as muscular relaxation, cessation of crying and elimination of frowning, in newborn infants?

CHAPTER II

METHODOLOGY AND DATA COLLECTION

This chapter is devoted to a discussion of the methodology and data collection plan. Sample selection, management of variables, procedures of data collection, and data analysis methods are explained.

I. SELECTION OF SUBJECTS

A convenience sample of newborn infants at Colorado General Hospital was selected for observation. A random sample would have been preferable, but due to the limited number of infants this was not possible. Eighteen infants were chosen; the investigator recognizes the limitations of this small sample. However, due to the criteria established for sample selection and the time limit, only eighteen newborns were available.

Age, relinquishment of legal custody by the mothers, and general physical condition of the infants were the criteria considered for selection. The infants chosen were those being relinquished by their mothers; this criterion was established to insure that the tactile stimulation which the infants received was from nursing personnal rather than from the mothers as well.

All the infants selected were at least twelve hours

of age at the time of the first observation and not more than ninety-six hours at the time of the final observation. This age limit was established because the infants remained in the hospital for at least five days before they were transferred to an adoption agency. The selection of newborns rather than older infants was made to eliminate variance due to previous learning.

General physical condition of each infant was considered as the investigator assumed that the responses of an ill infant would differ from those of a healthy newborn. Only healthy infants were selected for observation.

II. MANAGEMENT OF VARIABLES

The independent variable was tactile stimulation; no effort was made to manipulate this variable, as the investigator was interested in comparing the amount of tactile stimulation with the amount of positive responses, the dependent variable.

The independent variable, tactile stimulation, was indicated by holding, cuddling and/or touching measured in seconds of time. These behaviours are the means by which tactile stimulation is provided to the newborn. The indicators were divided into two categories, bodily contact, including holding and/or cuddling, and touching. This categorized distinction was made to determine which was

more effective in producing positive responses, the close physical contact of holding and/or cuddling or the limited contact of touching.

The dependent variable, positive responses, was indicated by the onset of cessation of crying, elimination of frowning, and/or observable muscular relaxation.[27] These three indicators were not categorized and recorded individually, as the investigator found this was impossible due to overlap. While the indicators of positive responses were crude and limited to overt behavior, these seemed to be appropriate in view of the lack of other more feasible indicators. Negative and neutral responses were also recorded; this was done to facilitate the recordings and was not of major concern in the study.

The twenty-four hour intake and weight of each infant was recorded at each observation. Though not of primary interest to the study, this was done to determine if a relation existed between these two variables and the tactile stimulation the infants received.

III. METHOD OF DATA COLLECTION

The investigator made preliminary observations to determine whether the variables were observable and possible

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[27]Margo McCaffery, op. cit., p. 34.

to measure. Results of these observations indicated that the variables, as defined, could be observed and recorded.

The only change the investigator made was to modify the definition of tactile stimulation to include that provided during feeding of the infants. This modification was made because the infants were frequently held longer than the average feeding time, but the investigator could not determine exactly when feeding and bubbling were completed, and the infants were just being held.

The investigator observed and recorded in seconds the tactile stimulation which nursing personnel provided each infant by means of a stopwatch. The response of each infant was observed and recorded in seconds. The decision to use amount of time rather than the number of times an infant received tactile stimulation was made so that a more accurate measure could be obtained. There was no attempt made to describe the quality of tactile stimulation, as this was beyond the scope of this investigation.

The first observation of each infant was done the afternoon of the first day after birth from one o'clock to three o'clock in the afternoon. This procedure was repeated the following three days. Preliminary observations had revealed no essential differences in the amount of tactile stimulation given the infants during different periods of the day. However, it is possible that the tactile stimulation

observed and recorded during these two hour periods was not representative of that given during the four days.

All observations and recordings were done by the investigator; therefore, observer bias was assumed to be constant. However, it is possible that the recordings were biased due to the increasing skill of the observer.

IV. DATA ANALYSIS

The purpose of the study was to determine the relationship between tactile stimulation given infants and positive responses of the infants. The coefficient of correlation, r^2, was used to determine how strongly the variables were related. This measure also allowed interpretation as percentage of error reduction.[28]

The correlation, r, between bodily contact and positive responses was 0.59; the percentage of error reduction was 35%. The correlation between touch and positive responses was 0.24; hence, percentage of error reduction was 6%. (See Appendix A.)

Bodily contact and total intake indicated a correlation of 0.04, and touch and total intake a correlation of 0.29. The relation between bodily contact and weight was

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[28]Herbert Costner, "Criteria for Measures of Association," American Sociological Review, 30:343, June, 1965.

was 0.06, and the relation between touch and weight was 0.37.

V. SUMMARY

A comparative study was designed to test the hypothesis that the greater the amount of time devoted to providing tactile stimulation to newborns, the greater the positive responses of the infants. Tactile stimulation was categorized into bodily contact, including holding and/or cuddling, and touching. Tactile stimulation provided the infants by the nurses was observed and recorded in seconds. Correlation of coefficient, r^2, was used to determine the relationship between the variables. A correlation of 0.59 was obtained between bodily contact and positive responses, and a correlation of 0.24 was obtained between touching and positive responses.

CHAPTER III

INTERPRETATION OF RESULTS, CONCLUSIONS AND SUMMARY

I. RESULTS AND INTERPRETATION

The hypothesis tested was: The greater the amount of nursing time devoted to providing tactile stimulation to newborn infants, the greater the positive responses of the infants.

The correlation of 0.59 between bodily contact and positive responses was interpreted as being moderate. Percentage of error reduction was 35%, which means that prediction of one variable when the other variable is known can be made with this percentage of accuracy. Thus, the hypothesis was moderately supported by the data when holding and/or cuddling was the tactile stimulation provided the infants.

The correlation of 0.24 between touch and positive responses was interpreted as being only a slight relation. Percentage of error reduction was only 6%. Hence, the hypothesis was not supported when touching was the tactile stimulation provided the infants.

The correlation between bodily contact and intake was only 0.04, which indicated no error reduction. Similarly, the correlation between bodily contact and weight was 0.05.

Touch and intake revealed a correlation of 0.29, and touch and weight a correlation of 0.37. Although neither correlation was high, touch seemed to be more strongly related to intake and weight than was bodily contact. The investigator could offer no explanation for these correlations. Perhaps there was an optimum level of tactile stimulation, and above this level fatigue occurred, which affected intake and weight. It is possible that bodily contact provided excessive stimulation, and the infants became fatigued. This proposition is highly speculative, for the correlations could have been due to sampling variability alone.

It was recognized that the limitations of the study could have influenced the results, and that these limitations must be considered.

II. LIMITATIONS

1. The sample of newborn infants was a small convenience sample. Because of the limited size, sampling variability could have influenced the results, and the correlations obtained could have been due to chance alone.
2. Measures of responses were crude in that only overt physical behaviors were used as indicators of response to stimulation.

3. No attempt was made to measure the quality of tactile stimulation provided the infants; only quantity in terms of seconds was measured and recorded. It is possible that the manner in which the stimulation was provided was influential in the responses of the infants, thereby producing extraneous effects.
4. No attempt was made to control the sensory stimulation which the infants received through vision and hearing. Even though these senses are not well-developed at birth, it is possible that the responses to tactile stimulation were influenced by the infants' seeing and/or hearing the nursing personnel.
5. All the observations and recordings were done by the investigator. Although observer bias was assumed to be constant throughout the observations, it is possible that, as the observer became more skilled, tactile stimulation and responses were recorded differently, thus influencing the results.
6. Observations were made only during two hours of the day, and no attempt was made to control the amount of tactile stimulation which the infants received at any time. It is possible that the tactile stimulation given the infants during the observation periods was not representative of the amount of tactile stimulation given during the other twenty-two hours of the day.

III. CONCLUSIONS

Considering the results and limitations of the study, the following conclusions were formulated:

1. There was a moderate relationship between bodily contact given newborn infants by nursing personnel and the positive responses of the infants.
2. There was only a slight relationship between touch given newborn infants by nursing personnel and the positive responses of the infants.
3. Bodily contact given newborn infants by nursing personnel was more effective in producing positive responses in newborn infants than was touch.

IV. RECOMMENDATIONS FOR FURTHER STUDY

1. This study should be repeated using a larger sample of newborn infants; this would decrease the sampling variability and increase confidence in the relationships obtained.
2. A study in which the infants were observed over a twenty-four hour period for a specified number of days would clarify the exact amount of tactile stimulation which each infant received and the corresponding responses of the infants.
3. A study designed to determine the relationship between

intake and weight and tactile stimulation would be useful in establishing whether an optimum range exists in the amount of tactile stimulation for newborn infants.

4. In order to eliminate the possible variables of hearing and vision, a study in which these were controlled should be designed. Such a study would allow more confidence in the results obtained between tactile stimulation and positive responses.

V. SUMMARY

A comparative study was designed to test the hypothesis that the greater the amount of nursing time devoted to providing tactile stimulation to newborn infants, the greater the positive responses of the infants. Tactile stimulation was categorized into holding and/or cuddling, and touching. Tactile stimulation provided the infants by nursing personnel was observed and recorded in seconds, and the responses of the infants were observed and recorded in seconds. Correlation of coefficient, r^2, was utilized to determine the relationship between the variables. A correlation of 0.59 was obtained between bodily contact and positive responses, and a correlation of 0.24 was obtained between touching and positive responses. Therefore, it was concluded that bodily contact provided newborn infants by nursing personnel had moderate effects on positive responses

in newborn infants, but that touch had less effect.

On the basis of the results of this study, it appears that tactile stimulation should be used cognitively and purposely by nursing personnel involved in the care of newborn infants. Results of McCaffery's study indicated the sense of touch to be most effective in eliciting positive responses. This study indicated that holding and/or cuddling were the most effective methods of using the sense of touch. Since holding and/or cuddling elicits positive responses from the infants, bodily contact should be considered an essential component of the nursing care. Bodily contact can be given the infants while physical care is given.

The effects of touch provided by nursing personnel are less demonstrable. While it appears that touch is used less frequently than bodily contact, further study is needed to determine if touch can be used to communicate effectively with infants, thereby possibly increasing positive responses. Since touch involves less physical closeness than does holding and cuddling, it is possible that such variables as part of the infant's body touched, surface area of the nurse's body involved in touching, and the quality of touch are more important than quantity in eliciting responses.

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APPENDIX I

A. SUMMARY OF DATA ON TACTILE STIMULATION PROVIDED BY NURSING PERSONNEL AND POSITIVE RESPONSES OF INFANTS

	RANGE IN SECONDS	MEAN IN SECONDS
BODILY CONTACT	0-3406	982
TOUCH	0- 350	144
POSITIVE RESPONSES TO BODILY CONTACT	0-4770	982
POSITIVE RESPONSES TO TOUCH	0-1500	223

B. SUMMARY OF DATA ON INFANT INTAKE

RANGE OF INTAKE IN CC PER 24-HOUR PERIOD	MEAN INTAKE IN CC. PER 24-HOUR PERIOD
110-580	401

C. SUMMARY OF DATA ON WEIGHT OF INFANT

RANGE OF WEIGHT IN GRAMS	MEAN WEIGHT IN GRAMS
2600-4900	3257