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A program of early breast contact for the premature infant

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A Program of Early Breast Contact for the Premature Infant

by

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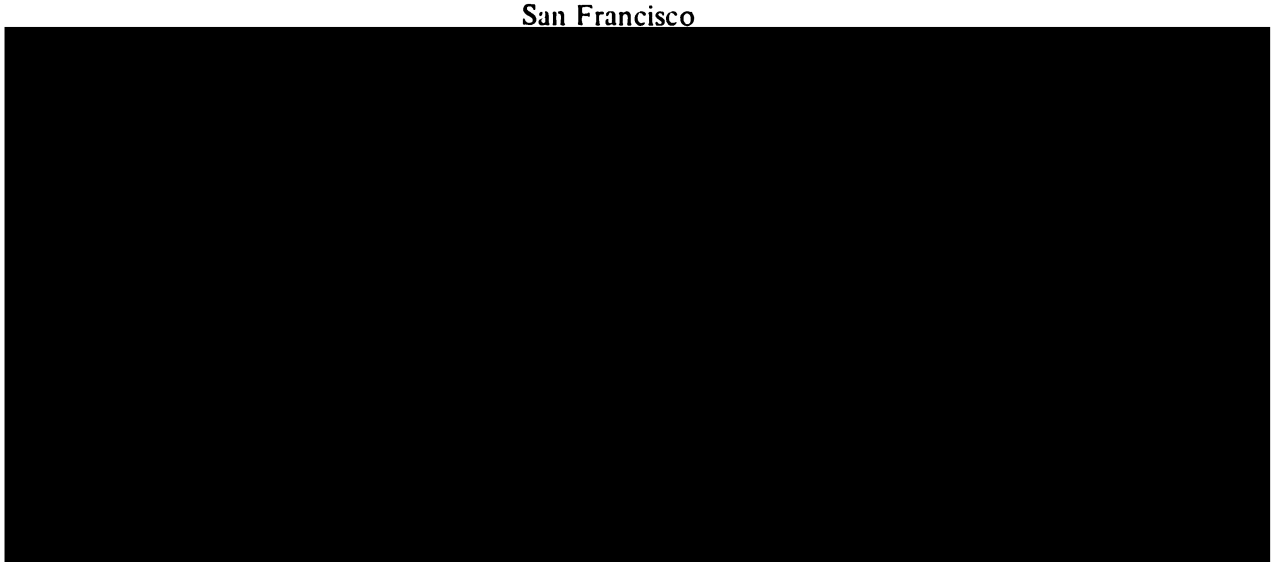

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ABSTRACT

This study was designed to determine whether a program of early breast contact would facilitate the premature infant's transition from tube- and bottle-feeding to breast-feeding. In the experimental phase of the study, two premature infants were given oral contact with the mother's breast during tube-feedings and prior to bottle-feedings. Nine premature infants in the control group, eight of whom were obtained through retrospective chart audit, had no breast contact until the initiation of breast-feeding. The two groups were compared for the number of trial breast-feedings which occurred between the initiation of breast-feeding and the time at which the infants were able to take the required volume of milk per feeding from the breast during three of four consecutive breast-feedings and for the mean percentage of the required volume of milk per feeding that the infants were able to take from the breast at each feeding. Neither of the infants in the experimental group were able to take the required volume of milk per feeding from the breast at any time during the study period. Two infants in the chart audit control group were able to take the required volume of milk from the breast beginning with the first and third trial breast-feedings. The mean percentage of the required volume of milk taken from the breast was 40.7% for infants in the experimental group and 46.7% for infants in the control group. The study also described ten maternal and infant variables associated with breast-feeding the premature infant.

SUMMARY

The breast-feeding problems many mothers experience are compounded for the mother who gives birth prematurely by the infant's physical immaturity and the length of time which must elapse before the infant is able to breast-feed. Infants born before 35-36 weeks gestation are usually fed by gastric tube or bottle until they are able to suck effectively. While the mother waits for her infant to grow, she must initiate and artificially maintain lactation. When the infant is strong enough to begin breast-feeding, the transition to breast-feeding may be complicated by the mother's anxiety, which may reduce her ability to breast-feed, and by the infant's frustration at being presented with a new and more difficult way of feeding.

If stress to mother and infant is reduced by offering them a gradual learning experience beginning with early, non-sucking oral contact of the premature infant with the mother's breast, the transition to breast-feeding may be facilitated and the mother's desire to breast-feed reinforced. Because mothers of premature infants are seen to be at increased risk for impaired maternal attachment and because breast-feeding contributes to maternal-infant attachment, the results of this study would be significant if the treatment facilitates breast-feeding the premature infant.

The research question addressed in this study was whether a program of early oral contact with the mother's breast would facilitate the premature infant's transition from tube- and bottle-feeding to breast-feeding. The null hypothesis was that there would be no difference between premature infants in the experimental group, who had

breast contact during tube-feedings and prior to bottle-feedings, and those in the control group, who did not have breast contact, in the number of trial breast-feeding which occurred between the initiation of breast-feeding and the time at which the infants were able to take the required volume of milk per feeding from the breast during three out of four consecutive feedings.

A quasi-experimental posttest only control group study was designed to test the null hypothesis. The initial structure of the design was experimental. During Phase I of the study, mother-infant subject pairs were randomly assigned to experimental and control groups. The experimental subjects were exposed to the independent variable, oral contact of the infant with the mother's breast initially for approximately five minutes during tube-feedings and subsequently for five minutes prior to bottle-feedings. Because it was not possible to obtain more than three subject pairs, two experimental and one control, the control group was expanded during Phase II of the study by the addition of eight chart audit subjects. This was done in order to obtain a broader data base for analysis of the possible effect of the independent variable on the dependent variable and to increase the body of descriptive data concerning the impact of maternal and infant variables on the process of breast-feeding the premature infant. Breast-feeding data for the experimental and control subjects in Phase I was collected by the nurses caring for the infants. Data for the Phase II control subject infants was collected by the investigator during retrospective chart audit. Breast-feeding data from both the Phase I and Phase II control groups were combined for comparison with the Phase I experimental subjects' breast-feeding data.

Infants in both the experimental and control groups were receiving all their feedings by gastric tube at the beginning of the study period. The infants who participated in the study had gestational ages of 29-32 weeks and were in the convalescent period of their hospitalizations. Mothers were all expressing breast-milk artificially for their infants and planned to breast-feed. During the period of time in which the infants were being tube-fed, the infants in the experimental group were put to breast during tube-feedings at least once each day. When these infants progressed to bottle-feedings, they were put to breast prior to bottle-feedings at least once each day. Control group infants in both Phase I and Phase II had no contact with the mother's breast until the initiation of breast-feeding trials. When infants in both groups were able to take one out of every three feedings from the bottle without losing weight, they began breast-feeding trials of thirty minute duration.

Analysis of raw data was begun by calculating the percentages of the required volume of milk per feeding each infant took from the breast during each trial breast-feeding. The percentages were then reviewed to determine whether any of the subject infants were able to take the required volume of milk from the breast during three out of four consecutive feedings. Neither of the infants in the experimental group were able to take the required volume from the breast at any time during their hospitalizations. Two infants in the chart audit control group were able to take the required volume of milk during three out of four consecutive breast-feedings beginning with the first and third trial breast-feedings respectively. Although there was a difference between premature infants in the experimental and control groups in the

number of breast-feeding trials which occurred between the initiation of breast-feeding and the time at which the infants were able to take the required volume of milk per feeding from the breast during three out of four consecutive feedings, the null hypothesis could not be accepted or rejected due to the small sample size and the lack of statistical analysis.

The two groups were also compared for the mean percentages of the required volume of milk per feeding that the infants were able to take from the breast during trial breast-feedings. The mean percentage of the required volume was 40.7% for the infants in the experimental group and 46.7% for the infants in the control groups.

The results of this study can not be generalized because of the small sample size and the infant and maternal variables which the investigator was unable to control. Variables which could not be controlled were maternal parity and prior breast-feeding experience, the frequency of breast-feeding during the study period, and the infant variables of sex, birthweight, clinical course, and of age, post-conceptual age, and weight at the initiation of breast-feeding trials. However, the study is significant because it adds to the body of nursing knowledge concerning the process of breast-feeding the premature infant. It describes the wide range of breast-feeding ability displayed by the infants in the study and the positive maternal reaction to early infant breast contact and demonstrates the feasibility of the experimental treatment as an alternative method for transition of the premature infant to breast-feeding.

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CHAPTER I

INTRODUCTION

PROBLEM AREA

Advances in perinatal medicine have led to decreasing morbidity and mortality rates among high-risk premature infants (Schaffer & Avery, 1977). Concurrently, increasing numbers of mothers are choosing to breast-feed their premature infants (Heird, 1976). Mothers frequently experience difficulty with breast-feeding during the first weeks of their infants' lives due to the inexperience of both mother and infant with the breast-feeding process, physical problems, and, especially in our Western society, lack of a role model to emulate. For the mother who gives birth prematurely, these problems are compounded by the infant's physical immaturity and the length of time which must elapse before the infant is able to breast-feed. Although there is no data regarding the number of mothers who are able to breast-feed their premature infants, clinical observation suggests that few are successful, possibly indicating that current practices associated with breast-feeding this special population are lacking in effectiveness.

Premature infants born before 35-36 weeks gestation have neither the strength nor the neurological development required to breast-feed and are usually fed by gastric tube or bottle until they are able to suck effectively. While the mother waits for her infant to grow, she must initiate and maintain lactation and artificially express her milk to feed the infant. This period of time may extend to several months, during which the infant has no contact with the

mother's breast.

When the infant is strong enough to begin breast-feeding, the learning process is complicated by the mother's anxiety and the infant's frustration at being presented with a new and more difficult way of feeding. The first attempts at breast-feeding may be traumatic for both mother and infant. The mother, having anticipated this event for weeks or months, may be understandably anxious and concerned about her ability to breast-feed, especially if she has no previous experience with the process. This anxiety and the unfamiliar experience of exposing her breast to those who are helping position the infant may inhibit the milk-ejection reflex by sympathetic nervous system stimulation, thereby decreasing the mother's ability to breast-feed. The infant, finding that the mother's nipple does not respond to the pattern of sucking the infant has learned while bottle-feeding, may grow increasingly frustrated and reject the mother's nipple, adding to the mother's feelings of inadequacy.

If the transition to breast-feeding is a sequence of stressful events instead of the beginning of the warm, nurturant interaction the mother has envisioned, she may regret her decision to breast-feed and abandon the attempt. However, if stress to mother and infant is reduced by offering them a gradual learning experience beginning with early, non-sucking oral contact of the infant with the mother's breast, the transition to breast-feeding may be facilitated and the mother's desire to breast-feed reinforced.

The results of this study would be significant if the treatment facilitates breast-feeding the premature infant. Mothers of premature infants are seen to be at increased risk for impaired attachment

due to early and prolonged maternal-infant separation and to maternal feelings of inadequacy engendered by the inability to carry the pregnancy to term (Caplan, 1960; Cramer, 1976; Kaplan & Mason, 1960; Leifer, Leiderman, Barnett & Williams, 1972). Breast-feeding contributes to maternal-infant attachment by increasing physical contact between mother and infant and by increasing maternal self-esteem (Klaus & Kennell, 1976). When breast-feeding the premature infant is facilitated, maternal attachment is enhanced and the prognosis for appropriate maternal-infant interaction improved.

RESEARCH QUESTION

The research question to be addressed in this study is whether a program of early oral contact with the mother's breast will facilitate the premature infant's transition from tube- and bottle-feeding to breast-feeding.

ASSUMPTIONS

Because there is little data concerning the process of breast-feeding the premature infant, this study is based on several assumptions suggested by clinical observation. It is assumed that breast-feeding is a feasible method of feeding the premature infant, that premature infants and their mothers experience more difficulty during the establishment of breast-feeding than do full-term infants and their mothers, and that breast-feeding the premature infant may be facilitated by means of appropriate nursing interventions.

NULL HYPOTHESIS

There will be no difference between premature infants in the

experimental group, who have breast contact during tube-feedings and prior to bottle-feedings, and those in the control group, who do not have breast contact, in the number of trial breast-feedings which will occur between the initiation of breast-feeding and the time at which the infants are able to take the required volume of milk per feeding from the breast during three out of four consecutive feedings.

CHAPTER II

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

THEORETICAL FRAMEWORK

Physiology of Lactation

The onset of prolactin-induced lactation occurs following post-partum withdrawal of placental lactogen, estrogen and progesterone (Vorherr, 1974). When sensory receptors in the nipple and areolar margin are stimulated, impulses are transmitted via afferent somatic pathways to the hypothalamus which in turn stimulates anterior pituitray secretion of prolactin and posterior pituitary secretion of oxytocin (Applebaum, 1975). Prolactin, in the presence of supporting metabolic hormones, stimulates synthesis of milk by the mammary secretory epithelium and release of milk into the alveoli and smaller milk ducts (Tyson, 1977). Oxytocin stimulates contraction of the myoepithelial cells surrounding the secretory cells, forcing fat and protein particles into the ductal system with resultant ejection or "letting-down" of milk. Unless the breast is stimulated and the collection ducts emptied, lactation quickly ceases due to reduced serum prolactin levels and the compression of secretory cells by engorgement of the breast. In order to maintain lactation, the neurohormonal milk-ejection reflex must be elicited and the milk removed from the breast (Applebaum, 1975).

The Milk-ejection Reflex

The milk-ejection reflex is most easily elicited by the infant's sucking at the breast (Applebaum, 1975). However, milk

ejection also occurs as a result of tactile and pressure receptor stimulus when an infant's mouth is placed against the mother's nipple, whether or not the infant sucks at the breast (Sala, Luther, Arballa & Funes, 1974). Newton and Newton (1948) were not able to demonstrate the reflex in response to the electrice breast-pump; their single subject experienced let-down only after her infant had been put to breast briefly. Auerbach and Rees (1977) state that the milk-ejection reflex is weak and unstable when artificial expression is the only means of nipple stimulation and that mothers of premature infants experience decreased milk production as the length of infant hospitalization increases. Chatterton (1978) comments that oxytocin release can become a conditioned reflex, as evidenced by the let-down many mothers experience when they prepare to breast-feed or hear their infants cry.

Neurohormonally-induced milk ejection may be described as an unconditioned response since it is the result of an unconditioned stimulus, is involuntary, is controlled by the autonomic nervous system, and is able to be classically conditioned (Hilgard & Bower, 1975). Skinner (1938) states that the magnitude of a response is a function of the intensity of the stimulus and that it may be increased by a facilitating emotional stimulus. The strength of a response may also be increased by primary reinforcement (Rachlin, 1970). In the milk-ejection reflex, stimulation of tactile and pressure receptors in the nipple and areola results in the response of milk ejection. The physiological stimulus and response are the same whether the reflex is initiated by the infant's sucking, manipulation of the breast during artificial expression of milk, or by placing the non-sucking infant's mouth against the nipple. However, the mother experiences pleasure

when her infant is at her breast as a result of the close contact with her infant and the feelings of nurturance engendered by the contact. This psychological stimulus increases the intensity of the stimulus and, therefore, the magnitude of the response.

If the premature infant is put to breast, the touch and pressure of the mouth against the nipple should trigger the milk-ejection reflex and reinforce the response, thereby increasing to some degree the response of the breast to stimulation. This reinforcement may facilitate the transition to breast-feeding by strengthening the response of the milk-ejection reflex.

Transition to Breast-feeding

Anxiety may interfere with a mother's ability to breast-feed by inhibiting the milk-ejection reflex (Choi, 1978). Anxiety, fear and tension decrease the milk ejection response (Newton & Newton, 1950). Jelliffe (1976) describes the reflex as extremely sensitive to anxiety and disquiet, and Newton and Newton (1948) have demonstrated the role of distraction in inhibition of the reflex. Applebaum (1975) states that anxiety, distraction and embarrassment may greatly reduce the effect of oxytocin on myoepithelial cells by epinephrine-induced vaso-constriction of the mammary blood supply. Therefore, the anxiety the mother of a premature infant may be expected to experience on the first occasions of breast-feeding may interfere with her ability to breast-feed and further increase her anxiety. If the premature infant is put to breast early in life, before effective sucking can reasonably be expected, the mother has the opportunity to become habituated to the exposure of her breast to care-givers and to learn to hold her infant

comfortably and securely for breast-feeding in a non-testing situation. Stress and concomitant inhibition of the milk-ejection reflex should be decreased if actual breast-feeding is not a separate event but part of a continuum beginning with early non-sucking contact of the infant with the mother's breast.

According to Applebaum (1975), the pattern of sucking appropriate to breast-feeding is mechanically different from that of bottle-feeding and requires more energy expenditure by the infant. In breast-feeding, the nipple and areola are pulled into the mouth by the tongue and the areola is compressed by the lips and gums; the buccinator and orbicularis oris muscles are contracted. In bottle-feeding, the tongue pushes against the nipple in order to control the rate of flow; the buccinators and orbicularis oris are relaxed. Data published by Auerbach and Avery (1980) suggests that late breast-feeding following exposure to bottle-feeding may result in the infant's decreased willingness to accept the breast. Ideally, the breast-fed infant should have no nutritive sucking experience except with the breast (Choi, 1978; Stewart & Gaiser, 1978). However, the elimination of bottle-feedings entirely is not a practical alternative for most premature infants because their low energy reserves require that supplementary feedings be given. Supplementation solely with tube-feedings is usually not feasible because of decreased tolerance for tube-feedings as the gag reflex matures.

Hilgard and Bower (1975) state that learning is facilitated by frequency of repetition, reinforcement, practice and drive conditions. Measel and Anderson (1979) suggest that practice obtained through increased sucking opportunities associated with feedings may

facilitate readiness for nutritive sucking. The confusion and frustration that occur when the premature infant is put to breast after learning to bottle-feed may be decreased by giving the infant breast contact before nutritive sucking begins. If the premature infant is put to breast during tube-feedings and prior to bottle-feedings, the infant will have the opportunity to associate the satisfaction of hunger with the smell, feel and taste of the mother's nipple. Learning will be reinforced by practice, repetition, close mother-infant contact and the satisfaction of hunger. The infant will be able to learn the techniques of breast- and bottle-feeding concurrently, obviating the need to relearn to suck. The myodynamic confusion that may occur as a result of learning the two techniques at the same time is expected to be minimized by familiarity with the breast before the bottle is introduced.

Summary

Neurohormonally-induced lactation is initiated and maintained by eliciting the milk-ejection reflex. The reflex is elicited by stimulus of receptors in the nipple and areola and results in the ejection of milk. The reflex is most easily elicited by the stimulus of the infant's sucking but may also occur when the nipple is stimulated by the pressure of the non-sucking infant's mouth or during the artificial expression of milk. Milk ejection is an unconditioned response which may be classically conditioned. The strength of the response may be increased by the psychological stimulus and primary reinforcement of the mother's pleasure when her infant is at her breast. Giving the premature infant contact with the breast before

effective sucking is possible may facilitate the transition to breast-feeding by strengthening the response of the milk-ejection reflex.

The anxiety the mother of a premature infant may feel during the initiation of breast-feeding may decrease her ability to breast-feed by inhibiting the milk-ejection reflex. If the premature infant has contact with the mother's breast before effective sucking may be expected, the mother has the opportunity to become accustomed to holding her infant at her breast in a non-testing situation. If actual breast-feeding is part of a continuum rather than an isolated event, maternal stress and resultant inhibition of the milk-ejection reflex should be decreased.

Because the pattern of sucking appropriate for breast-feeding is different from that of bottle-feeding, the breast-fed infant should have no nutritive sucking experience other than with the breast. However, the elimination of bottle-feeding entirely is not a practical alternative for most premature infants. The premature infant's willingness to breast-feed may be increased by giving the infant breast contact before nutritive sucking begins in order to give the infant the opportunity to associate the satisfaction of hunger with the mother's breast and to reinforce the learning process by practice, repetition, close mother-infant contact, and the satisfaction of hunger.

Gunther (1970) has said that a mother's perception of the first breast-feeding experiences colors her attitude toward the entire process and may be the strongest factor in her decision to continue or abandon breast-feeding. By offering the mother and her premature infant a gradual, mutually pleasurable learning experience, it is

expected that the transition to breast-feeding will be accomplished with less frustration and more satisfaction for mother, infant and nurse.

REVIEW OF LITERATURE

A review of the literature reveals no reports of research directly related to the process of breast-feeding the premature infant, perhaps due to the more pressing concerns of reducing the morbidity and mortality of this high-risk population. While many articles and research reports are currently being published on the subject of breast-feeding, reflecting the trend to this mode of infant feeding, only a few mention that premature infants may be breast-fed and that there are particular breast-feeding problems associated with the prematurity of the infant.

Current Recommendations

Benda (1979) states that the infant born before 35-36 weeks gestation is usually not capable of the effort required to breast-feed and that mothers should be encouraged to maintain lactation by emptying their breasts artificially and to postpone breast-feeding until the infant is able to bottle-feed well. Klaus and Kennell (1977) suggest that mothers be encouraged to supply breast-milk for their premature infants in order to give the mothers a greater feeling of participation in their infants' care. MacKeith and Wood (1977) suggest that the premature infant be put to the breast as early and as frequently as possible "even if only for a half to one minute" in order to give the infant "nipple experience" (p. 206).

Clinical Observations

Whitley (1970), in a case study of one premature infant, suggests that breast-feeding is feasible and delineates the problems of milk expression and poor sucking ability but gives no solutions other than increased support for and attention to the mother. Auerbach and Rees (1977) and Stewart and Gaiser (1978) present clear and empathic clinical observations of the difficulties of breast-feeding the premature infant and offer practical suggestions to help the mother and infant, including the use of the Lact-Aid supplementer. However, no data concerning the effectiveness of the interventions is offered. Meier (1980) reports the implementation of a program designed to educate mothers of premature infants and support them in breast-feeding. The program has resulted in an increase in the number of mothers who are able to establish lactation; however, there is no defined measurement of this reported increase, and supporting data is not supplied.

Reports of Research

Research conducted by Measel and Anderson (1979) on the effect of non-nutritive sucking on the clinical course of premature infants suggests that the opportunity to practice sucking skills facilitates advancement to nutritive sucking. Fifty-nine infants with gestational ages of 28-34 weeks were assigned by alternate sequential series to treatment and control groups. The groups were matched for race, sex, birthweight, appropriateness of weight for gestational age, and need for assisted ventilation. Whether or not they demonstrated sucking behavior, infants in the treatment group were given pacifiers

during every tube-feeding and for five minutes following each feeding. Infants in the control group were never given pacifiers during or following tube-feedings. Infants in both groups were allowed to have pacifiers at any time other than during or after feedings, but, according to the researchers, this practice was uncommon. The treated infants were judged by their care-givers to be ready for bottle-feeding significantly ($P < .05$) earlier than those in the control group, had significantly ($P < .05$) fewer tube-feedings during their hospitalization than the control, and were discharged significantly ($P < .05$) earlier than the infants in the control group.

Auerbach and Avery (1980), in their study of relactation, the resumption of breast-feeding following cessation or a significant decrease in milk production, sought to determine what preparation is most supportive of relactation, what factors affect the infant's response to the breast, and how women assess the success of the relactation process. A questionnaire concerning the experience was completed by 366 women who had relactated following the birth of a low birthweight infant, untimely weaning, or separation of mother and infant due to hospitalization. The mothers were asked what issues led to their decision to relactate, what preparations they had made to relactate, how the infants responded to the breast, and how they assessed the success of the process. Enhancement of the mother-infant relationship was the reason given for relactation most commonly given by the respondents. Three quarters of the women who participated in the study evaluated relactation as a positive experience. The infants' willingness to suck was assessed at introduction to the breast and 10 days later and found to vary according to prior experience with breast-

feeding and to age and weight at relactation. At first contact with the breast, 61% of the hospital-separated infants, 39% of the untimely weaned infants, and 38% of the low birthweight infants were willing to suck at the breast (Chi square, $P < .05$). After 10 days of breast-feeding experience, 82% of the hospital-separated infants, 74% of the untimely weaned infants, and 62% of the low birthweight infants were willing to suck at the breast (Chi square, $P < .001$). Gestational ages of low birthweight infants were not obtained; birthweight was used as a gross estimate of prematurity. The mean birthweight of these infants was 1616gm. They were grouped for comparison in birthweight ranges of less than three pounds, three to four pounds, and greater than four pounds. Of the infants first put to breast between four and seven weeks of age, 52% were willing to suck at the initial trial; 73% accepted the breast by the tenth day. The infants put to breast before four weeks of age were less willing to suck at the first contact (37%) but showed the greatest increase (57%) over time. Less than half (45%) of the infants who were not put to breast for eight weeks or more were willing to suck at the first trial, and there was only 2% improvement in this group over time. The authors hypothesize that the infants' decreased willingness to breast-feed when the first contact occurred before four weeks of age or after eight weeks of age may be related to the method of feeding prior to breast-feeding experience. They speculate that the infants introduced to the breast at less than four weeks of age, being predominately of the higher birthweight group, were bottle-fed for the majority of time before breast-feeding was begun and that the infants who were not put to breast until eight or more weeks of age, being predominately of the lower birthweight group, had long

exposure to tube- and bottle-feedings. They suggest that the reduced willingness to suck demonstrated by these groups was the result of greaster exposure to bottle-feeding than the other group. In summary, although the validity of the data concerning breast-feeding may be questioned due to the retrospective and subjective nature of the study, these findings suggest that premature infants exposed to the breast early in life may be more receptive to breast-feeding.

Summary

Although many articles and research reports are currently being published on the subject of breast-feeding, little attention has been given to the particular problems associated with breast-feeding the premature infant. A review of the literature reveals no reports of research concerning the feasibility of breast-feeding the premature infant, the problems encountered during the initiation of breast-feeding, or the evaluation of the impact of nursing interventions on the process.

Direct references in the literature to the process of breast-feeding the premature infant are primarily concerned with the problems associated with the infant's neuromuscular immaturity, the difficulties of maintaining lactation until the infant is old enough to breast-feed and suggestions for facilitating the transition to breast-feeding. Reports of research tangential to the problem suggest that non-nutritive sucking facilitates the transition to nutritive sucking in the premature infant and that early exposure of the premature infant to the breast prior to prolonged exposure to tube- and bottle-feeding may facilitate the infant's acceptance of the breast.

CHAPTER III

METHODOLOGY

PURPOSE OF STUDY

The purpose of this study was to determine whether a program of early oral contact with the mother's breast would facilitate the premature infant's transition from tube- and bottle-feeding to breast-feeding.

STUDY DESIGN

This study was a quasi-experimental posttest only control group design. The initial structure of the study was experimental. During Phase I of the study, mother-infant subject pairs were randomly assigned to experimental and control groups. Experimental subjects were exposed to the independent variable, oral contact of the infant with the mother's breast during tube-feedings and prior to bottle-feedings.

However, it proved impossible to obtain more than three subject pairs, two experimental and one control. This was primarily due to the investigator's inability to control bottle-feeding exposure of potential subject infants by being in the setting each morning when nurses and physicians planned infant care. Although the nursery staff were aware of the research protocol, it was frequently overlooked due to the pressures of the nursery environment. Other factors which contributed to the small number of research subjects were the self-limited amount of time allotted for completion of the study and the admission to the nursery of a larger number of twins than usual. The

unit neonatologist had given approval for the participation of nursery infants in the study, but the permission of individual private physicians had to be obtained before infants in their care could participate. Nine potential subject pairs were lost to the study because the investigator was unable to contact the primary private physician for entry before the infant began bottle-feeding. Because the center used for data collection was not a tertiary care center, the majority of infants available for the study were in the convalescent phase of their hospitalization and were ready to begin bottle-feeding on admission to the nursery. The most serious cause of low subject numbers was the lack of provision in the setting for formal inservice instruction concerning the study. Because inservice was on an informal basis, the nursing staff had varying levels of understanding of the purpose of the study and criteria for subject selection. Due to nursing and medical staff misunderstanding of entrance criteria, six potential subject infants were lost to the study.

The admission of a larger than usual number of twins to the nursery could not be foreseen by the investigator. The complication of nursing staff misunderstanding of entrance criteria was not foreseen because the staff had commented appropriately concerning the criteria during the first month of the study when the investigator was able to be in the setting during the planning of infant care.

Despite the difficulties encountered in obtaining subjects, the research was not abandoned because it was believed that this beginning look at the practices associated with breast-feeding the premature infant could make an important contribution to the body of nursing knowledge concerned with this process. In order to obtain a

broader data base for analyis of the possible effect of the independent variable on the dependent variable and to increase the body of descriptive data concerning the impact of maternal and infant variables on the process of breast-feeding the premature infant, the control group was expanded during Phase II of the study by the addition of eight chart audit infant subjects. The retrospective chart audit approach was chosen because the self-limited amount of time allotted for completion of the research precluded extending the study until an adequate number of subjects could be obtained and because subjects obtained through chart audit had been exposed to the same environmental influences in the nursery as the subjects in the prospective experimental phase of the study.

The subjects added during Phase II were premature infants who had been cared for in the same facility as the Phase I subjects. Breast-feeding data for the infants added to the study during Phase II was collected by retrospective chart audit. Breast-feeding data from both Phase I and Phase II control groups were combined for comparison with the Phase I experimental subjects' breast-feeding data.

DEFINITION OF TERMS

Breast-feeding: is oral contact of the infant with the mother's breast for the purpose of feeding the infant the mother's breast-milk.

Breast contact: is oral contact of the infant with the mother's breast for the purposes of familiarizing the infant with the breast and stimulating the mother's milk-ejection reflex.

Clinical course: refers to the complications occurring during hospitalization. Common complications encountered in premature infants are

respiratory distress syndrome (RDS), persistence of fetal circulation (PFC), patent ductus arteriosus (PDA), infection and intermittent apnea.

Gestational age: is the number of weeks from the date of the mother's last menstrual period to delivery of the infant. The number of weeks is used to measure the length of the pregnancy and the infant's degree of maturity at birth. Full-term pregnancy is 40 weeks.

Oral contact: is placing the mother's nipple in the infant's mouth. In this study, the independent variable was oral contact of premature infant with the mother's breast initially for approximately five minutes during tube-feedings and subsequently for five minutes prior to bottle-feedings.

Postconceptual age: is a measure of infant maturity expressed in weeks calculated by adding the infant's gestational and chronological ages.

Required volume of milk per feeding: is usually determined by calculating the amount of milk necessary to supply the infant's caloric need for appropriate growth, between 100 and 120 kilocalories per kilogram per day, and dividing the total volume by the number of feedings the infant receives each day. This formula is a guideline only and may be modified if the infant appears to be unsatisfied by the allotted amount, has unusual caloric requirements, or requires fluid restriction.

Trial breast-feedings: In this study, the dependent variable was operationalized by counting the number of trial breast-feedings of 30 minute duration which occurred between the initiation of breast-feeding and the time at which the premature infant was able to take the required volume of milk per feeding from the breast during three out of four consecutive breast-feedings.

SAMPLE

Study subjects were 11 premature infants and their mothers. The three infants in Phase I of the study were cared for in the intermediate care nursery of a West Coast community hospital during the period from November, 1980, through March, 1981. The eight infants in Phase II of the study were cared for in the same facility during the period from December, 1979, through March, 1981. All the infants were transferred from tertiary center intensive care nurseries in the area for convalescent care following the acute phase of their illnesses.

Demographic data for the subject infants and mother is shown in Tables I and II. All the infants and mothers were Caucasian. The Phase I experimental group subject infants were both female; the Phase I control group subject infant was male. The Phase II control group subject infants included four females and four males. The infants' gestational ages ranged from 29 to 32 weeks. Birthweights of the infants ranged from 960 to 1800gm. All birthweights were appropriate to the infants' gestational ages. All but one infant were born vaginally. The complications of clinical course experienced by the infants during the acute period of their hospitalizations were typical of their degree of prematurity. For example, all but one infant were diagnosed as having respiratory distress syndrome, four had intermittent apnea of prematurity, and two experienced transient cardiovascular disorders, patent ductus arteriosus and persistent fetal circulation. One infant was suspected of having a general septicemia. At time of entry into the study, both Phase I and Phase II subject infants were in the convalescent period of their hospitalizations awaiting sufficient maturity to be discharged.

Background data concerning Phase II subject mother #5 is unknown to the investigator because it was not available in the infant's chart. Ages of the other mothers ranged from 19 to 32 years. Five were known to be primiparous. Only two mothers, one each in the Phase I experimental and control groups, were known to have previous breast-feeding experience. The most common known complications of pregnancy were premature rupture of amniotic membranes (PROM) and amnionitis. All mothers were supplying at least part of their infants' nutritional needs with artificially expressed breast-milk during the period of the study.

TABLE I

SUBJECT INFANTS

SUBJECT	SEX	BIRTH-WEIGHT	GESTATIONAL AGE	DELIVERY	APGAR	CLINICAL COURSE	DISCHARGE WEIGHT	DISCHARGE AGE
1*	F	1480gm	30 weeks	Vaginal	7/9	Mild RDS	2150gm	43 days
2*	F	1490gm	30 weeks	Cesarian	6/8	Mild RDS PFC	2020gm	36 days
3*	M	1420gm	31 weeks	Vaginal	7/9	Mild RDS Apnea	2180gm	62 days
4	F	1520gm	32 weeks	Vaginal	7/9	Mild RDS	2370gm	39 days
5	M	1300gm	32 weeks	Vaginal	6/?	Mild RDS PDA	2180gm	56 days
6	M	960gm	29 weeks	Vaginal	4/8	Mild RDS	2220gm	66 days
7	F	1120gm	29 weeks	Vaginal	6/8	Mild RDS Apnea	2110gm	54 days
8	M	1220gm	29 weeks	Vaginal	7/7	Sev. RDS Apnea	2180gm	57 days
9	M	1800gm	32 weeks	Vaginal	8/9	Mod. RDS	2120gm	30 days
10	F	1660gm	31 weeks	Vaginal	7/9	? Sepsis Apnea	2120gm	26 days
11	F	1660gm	31 weeks	Vaginal	1/9	Mild RDS	2180gm	28 days

*Phase I Subjects

TABLE II

SUBJECT MOTHERS

SUBJECT	AGE	PARITY	COMPLICATIONS OF PREGNANCY	PREVIOUS BREAST-FEEDING
1*	22	G1P0	Amnionitis	No
2*	28	G2P1	Preeclampsia	Yes
3*	24	G2P1	None	Yes
4	27	G4P1	PROM, Amnionitis	Unknown
5	?	?	Unknown	Unknown
6	32	G1P0	PROM, Amnionitis	No
7	26	G2P0	PROM	No
8	22	G1P0	Urinary tract infection	No
9	20	G4P1	Unknown	No
10	19	G1P0	PROM	No
11	26	G1P0	PROM, Amnionitis	No

*Phase I Subjects

Inclusion Criteria - Phase I

Criteria for entry of premature infants into the study during Phase I were gestational age between 29 and 32 weeks, absence of congenital anomalies which would interfere with breast-feeding, and informed parental consent. At time of entry into the study, the infants were able to tolerate room air, were totally tube-fed, and were capable of maintaining body temperature outside the incubator during feedings.

Mothers accepted into the study were those who had chosen to breast-feed and were expressing breast-milk for their infants. Only those mothers who were able to be with their infants in the nursery for at least one feeding each day were admitted to the study.

Exclusion Criteria - Phase I

No twins were accepted into the study in order to avoid introducing another variable and to avoid the complications in maternal-infant interaction which might have occurred had the twin infants been assigned to opposite groups. Mother-infant pairs would have been dropped from the study if the mother had reversed her decision to breast-feed, if the infant's feedings had been discontinued for more than one day, or if errors or omissions in following the protocol had occurred.

Inclusion Criteria - Phase II

Criteria for entry of premature infants into the study during Phase II were gestational age between 29 and 32 weeks and absence of congenital anomalies which would interfere with breast-feeding. At time of entry into the study, the infants were able to

tolerate room air, were capable of maintaining body temperature outside the incubator during feedings, and had not been breast-fed before admission to the study nursery. Mothers accepted into the study were those who had chosen to breast-feed and were expressing breast-milk for their infants.

Exclusion Criteria - Phase II

No twins were accepted into the study to avoid introducing another variable. Mother-infant pairs would have been dropped if the infant's feedings were discontinued for more than one day. In order to maximize the amount of available descriptive data concerning the variables associated with breast-feeding the premature infant, subject pairs were not dropped if the mother reversed her decision to breast-feed or was not in the nursery for at least one feeding each day.

SAMPLE SELECTION AND ASSIGNMENT TO GROUPS

PHASE I

When a premature infant meeting the inclusion criteria was admitted to the nursery, the investigator requested permission for entry into the study from the infant's primary physician. After approval was obtained, the infant's mother was invited to participate in the study. When the mother had given informed consent to participation, she was asked to choose one of 30 folded slips of paper from an envelope; half were marked "experimental", the other half "control". The mother-infant pair was assigned to the experimental or control group according to the mother's random choice. Two experimental subject pairs, #1 and #2, and one control subject pair, #3, were selected and assigned to groups in this manner.

PHASE II

Potential chart audit subjects were selected by review of the nursery census log in which all admissions are entered. Twenty-three infants were identified in the log as having gestational ages between 29 and 32 weeks; the majority of the infants listed in the log were unidentified by gestational age. Charts for 17 of these infants were available for review. Chart audit revealed that four of these infants were bottle-fed only and that two breast-feeding infants had been breast-fed during their stays in the referring hospitals; these infants were excluded from the study. Three of the infants were those who participated in Phase I of the study. The remaining eight premature infants were selected and considered control subjects since they had no opportunity for exposure to the independent variable.

PROCEDURE

Mothers and premature infants in the Phase I experimental and control groups and in the Phase II control group were treated according to usual nursing care practices in the nursery. According to standard nursery procedures, infants were fed every two to three hours. Infants weighing less than 1500gm were fed on a two hour schedule; larger infants were fed on a three hour schedule. Mothers were welcome to be in the nursery with their infants for as many of the infants' feedings as possible. The infants were well wrapped in blankets while they were held by their mothers, and nurses caring for the infants supervised all feedings. All of the infants were fed according to standard nursery procedure when their mothers were not

present. All infants were weighed before and after breast-feeding on a scale calibrated in grams. The number of grams of weight gained by the infant during the feeding represented the amount of milk ingested by the infant on a gram per milliliter basis. Infants were offered a bottle-feeding after breast-feeding if the amount of milk ingested was less than the amount the infant needed each feeding to gain weight appropriately. The amounts of milk taken from the breast and from the bottle was recorded by the nurse caring for the infant and supervising the feeding.

Phase I - Experimental Group

Infants in the experimental group were receiving all their feedings by gastric tube at time of entry into the study. During the period in which the infants were being tube-fed, mothers put their infants to breast during tube-feedings at least once each day. The nurse wrapped the infant in blankets, inserted the #8 orogastric feeding tube, and checked the tube for proper placement while the infant was in the incubator. The infant was then positioned in the mother's arms and the infant's mouth applied to the mother's nipple. After the infant was properly positioned on the breast, the nurse administered the feeding. During the feeding, the infant was not encouraged to suck but was not discouraged from doing so. If the infant's mouth slipped off the nipple during the feeding, it was reapplied as many times as was necessary to give the infant contact with the nipple during the entire feeding. After the feeding was completed, the infant was removed from the breast and the feeding tube withdrawn. Breast contact time was recorded in the nurses' notes and on the data

collection form shown in Appendix B.

When infants in the experimental group evidenced readiness for nutritive sucking by displaying sucking behavior before and during tube-feedings, they began bottle-feedings in addition to tube-feedings. During this period of time, the infants were put to breast by their mothers for five minutes prior to bottle-feedings at least once each day. The mother was allowed to encourage sucking by manipulating her nipple in the infant's mouth and by expressing milk into the infant's mouth. The infant's mouth was reapplied to the nipple if it slipped off during the five minute breast contact period. Infants were weighed before and after breast contact, and the duration of contact and the amount of milk taken from the breast was recorded in the nurses' notes and on the data collection form by the nurse supervising the feeding.

When the infants were able to take one of every three feedings by bottle without weight loss, mother-infant pairs began breast-feeding trials. The trials were of 30 minute duration and occurred at least once each day. The mother was allowed to encourage her infant to suck during breast-feeding, and the infant's mouth was reapplied to the nipple if it slipped off during the 30 minute feeding period. After the breast-feeding was completed, the feeding and the amount of milk the infant was able to take from the breast was recorded in the nurses' notes and on the data collection form by the nurse supervising the feeding. A summary of breast-feeding trials for the Phase I experimental group is displayed in conjunction with that of the Phase I and Phase II control groups in Table IV.

Exposure of the Phase I experimental subject pairs to the

independent variable is summarized in Table III. Subject infant #1 weighed 1590gm and was 20 days old at entry to the study. She had 36 minutes of breast contact time during seven feedings occurring over six days. Subject #2 weighed 1420gm and was 15 days old at date of entry. She had 66 minutes breast contact time during 13 feedings occurring over 10 days.

TABLE III

EXPOSURE TO INDEPENDENT VARIABLE

SUBJECT	#1	#2
AGE AT ENTRY	20 days	15 days
WEIGHT AT ENTRY	1590gm	1420gm
NO. OF CONTACTS DURING TUBE-FEEDINGS	2	4
TOTAL TIME DURING TUBE-FEEDINGS	11"	21"
NO. OF CONTACTS PRIOR TO BOTTLE	5	9
TOTAL TIME PRIOR TO BOTTLE-FEEDINGS	25"	45"
TOTAL EXPOSURES TO VARIABLE	7	13
TOTAL TIME EXPOSED TO VARIABLE	36"	66"
DAYS OF EXPOSURE	6	10

Phase I - Control Group

The mother-infant pair in the control group was treated according to usual nursery practice. The infant was receiving all his feedings by gastric tube at time of entry into the study. The mother was allowed to hold her infant during tube-feedings administered by nurses. When the infant evidenced readiness for nutritive sucking by displaying sucking behavior prior to and during tube-feedings, he

began bottle-feedings in addition to tube-feedings, and his mother was allowed to bottle-feed him. When the infant was able to take one of every three feedings from the bottle without losing weight, he and his mother began breast-feeding trials of 30 minute duration at least once each day. After each breast-feeding, the feeding and the amount of milk taken from the breast was recorded in the nurses' notes and on the data collection form by the nurse supervising the feeding. Until breast-feeding trials began, the infant had no contact with the mother's breast. A summary of breast-feeding trials is presented in Table IV.

Phase II - Control Group

Because data was collected by retrospective chart audit and the investigator was unable to control the care of the subject pairs in this group, it must be assumed that they were treated according to usual nursery practice. All the infants were receiving all their feedings by gastric tube or bottle when they were admitted to the nursery. Progression from tube-feeding to bottle-feeding was at the discretion of the infant's physician; this usually occurs when nurses indicate that the infant is evidencing readiness for nutritive sucking by displaying sucking behavior prior to and during tube-feedings. Progression to breast-feeding was also at the discretion of the infant's physician; this usually occurs when the infant demonstrates competent nutritive sucking by taking one of every three feedings from the bottle without losing weight. Prior to the initiation of breast-feeding, usual nursery practice is that infants have no contact with the mother's breast. When infants in this group began breast-

feeding, all feedings and the amount of milk taken from the breast were recorded in the nurses' notes by the nurse supervising the feeding. Although usual nursery practice is to limit each breast-feeding to 20-30 minutes in order to avoid tiring the infant, the time allowed varies according to the mother's wishes and the nurses' discretion. No notation of the duration of breast-feedings was found during chart audit. Data concerning the breast-feeding experience of the subject pairs in this group was collected by the investigator during retrospective chart audit using the data collection form shown in Appendix B. A summary of breast-feeding experience for this group is shown in Table IV.

SUMMARY OF BREAST-FEEDING EXPERIENCE

At initiation of breast-feeding, ages of infants in the study ranged from 10 to 47 days. Weights of the infants ranges from 1280 to 1930gm. The range of postconceptual age was 32 to 38 weeks. Eight of the infants had daily breast-feeding experience. Six breast-fed more than once in a day on at least one occasion. Infants #1, #2, #4 and #7 were the only infants who were able to take a measurable amount of milk from the breast at every feeding. Only four infants, #4, #6, #7 and #9 were able to take the required volume of milk from the breast at any time during the study period. Infants #7 and #9 were able to take the required volume during three out of four consecutive breast-feedings, beginning with the first and third breast-feeding trials, respectively. Two mothers, #5 and #8, discontinued breast-feeding before their infants were discharged from the nursery.

TABLE IV

BREAST-FEEDING TRIALS

SUBJECT	INITIATION OF BREAST FEEDING			NUMBER OF TRIALS	DAYS	1ST TRIAL AT WHICH 100% REQUIRED VOLUME TAKEN
	AGE	POSTCONCEPTUAL AGE	WEIGHT			
1*	26d	34 weeks	1810gm	17	17	Never
2*	26d	34 weeks	1660gm	14	11	Never
3*	43d	37 weeks	1700gm	29	18	Never
4	27d	36 weeks	1930gm	12	12	#11[a]
5	41d	38 weeks	1705gm	12	12	Never[b]
6	41d	35 weeks	1450gm	13	12	#8[a]
7	47d	36 weeks	1870gm	17	8	#1
8	23d	32 weeks	1280gm	11	11	Never[b]
9	10d	33 weeks	1510gm	17	17	#3
10	16d	33 weeks	1840gm	8	8	Never
11	16d	33 weeks	1860gm	16	12	Never

* Phase I Subjects

[a] One time only

[b] Discontinued breast-feeding before discharge

DATA COLLECTION FORM

The form shown in Appendix B was used for data collection. It was constructed by the investigator because no existing form was available for recording the variables being examined by the study. These variables were infant age and weight, the required volume for each feeding, the time of day at which breast contact occurred, the duration of breast contact, the amount of milk taken from the breast as measured by weight gain, and the type of breast contact.

For Phase I subjects, breast contact was recorded by the nurse in the nurses' notes as usual and on the form. During Phase II chart review, the investigator used the same form to collect data for all the subjects, including the Phase I subjects.

The form was tested for contect validity by submitting it to the scrutiny of neonatal nurses who were familiar with the design and purpose of the study. Reliability was tested by comparing nurse-recorded data concerning the three Phase I subjects with data collected by the investigator during chart audit of the same three subjects; the data were identical. Utility of the form was assessed by asking nurses in the nursery whether they experienced any difficulties using or understanding the form; all reported no difficulty.

LIMITATIONS

The major limitation of this study is the small sample size. In the absence of a large sample with random assignment of subjects to experimental and control groups, generalization of the results is not possible.

Internal validity of the study is severely limited by the

many intervening variables the investigator was unable to control. Examples of maternal variables are age, motivation, complications of pregnancy, level of fatigue, prior experience with breast-feeding and infant care, level of education, level of knowledge concerning breast-feeding, degree of support given by significant others, ability to be in the nursery with the infant, and pressures of the home and work environments. In some instances, prior maternal experience with breast-feeding was unkown. Information concerning the maternal variables other than age, parity and complications of pregnancy was not available for comparison. Examples of infant variables are sex, clinical course, treatment at the referring hospital, gestational age, postconceptual age at date of entry into the study and at breast-feeding trials, and duration of hospitalization. It was hoped that random assignment of mother-infant subject pairs to experimental and control groups would minimize the impact of these variables. However, the small sample size and the necessity of abandoning the experimental design and the subsequent utilization of a quasi-experimental chart audit precluded the use of randomization.

Another threat to the validity of the study is the lack of knowledge concerning the duration of breast-feeding for the infants in the Phase II chart audit control group. The time spent at the breast per feeding may have been twice that allowed the infants in the Phase I experimental group.

Interrater reliability is also a threat to validity. Although reliability of the data collection form is established, interrater reliability associated with weighing the infants before and after feedings may be questioned. Additionally, accuracy of the collected data

may be impaired by errors made during recording in the nurses' notes and on the form by the nurses caring for the infants. The subject infants were classified according to estimated gestational age by the health care professionals caring for them in the referring hospitals, but there is no available information concerning which tool was used for assessment or concerning the accuracy of the examiner.

Finally, the validity of the study is threatened by the possible impact of maturation on the nursery staff during the 15 month period covered by the chart audit and by the effect of the awareness of being tested on the Phase I subject mothers.

CHAPTER IV

RESULTS

ANALYSIS FOR INDEPENDENT VARIABLE

The null hypothesis for this study was that there would be no difference between premature infants in the experimental group, who had breast contact during tube-feedings and prior to bottle-feedings, and those in the control group, who did not have breast contact, in the number of trial breast-feedings which occurred between the initiation of breast-feeding and the time at which the infants were able to take the required volume of milk per feeding from the breast during three out of four consecutive feedings. Analysis of the raw data shown in Appendix C was begun by calculating the percentages of the required volume of milk each infant took from the breast during each trial breast-feeding. The percentages were then reviewed to determine whether any of the subject infants were able to take the required volume of milk per feeding from the breast during three out of four consecutive breast-feedings. Only two infants in the study, #7 and #9, were able to take the required volume of milk during more than one breast-feeding. Infant #7 took the required volume from the breast during three out of four consecutive feedings beginning with the first trial breast-feeding; infant #9 was able to do so beginning with the third trial breast-feeding. Both infants were in the Phase II chart audit control group. Neither of the infants in the Phase I experimental group were ever able to take the required volume of milk from the breast during their hospitalizations. There was a difference between premature infants in the experimental and control groups in the number of trial breast-

feedings which occurred between the initiation of breast-feeding and the time at which the infants were able to take the required volume of milk per feeding from the breast during three out of four consecutive feedings. However, due to the inequality of numbers in the sample groups and to the lack of statistical analysis because of the small number of subjects in the experimental group, the null hypothesis can not be accepted or rejected.

The experimental and control groups were then compared using the mean percentages of the required volume of milk each infant took from the breast during trial breast-feedings as the basis of comparison. These mean percentages are shown in Table V and Figure 1. The mean percentage of the required volume of milk was 40.7% for the infants in the Phase I experimental group, less than the mean percentage of 46.7% achieved by the infants in the Phase I and Phase II control groups. These findings may be an artifact of numbers and are in question as the subject groups were unequal in size and the total sample size was small.

TABLE V

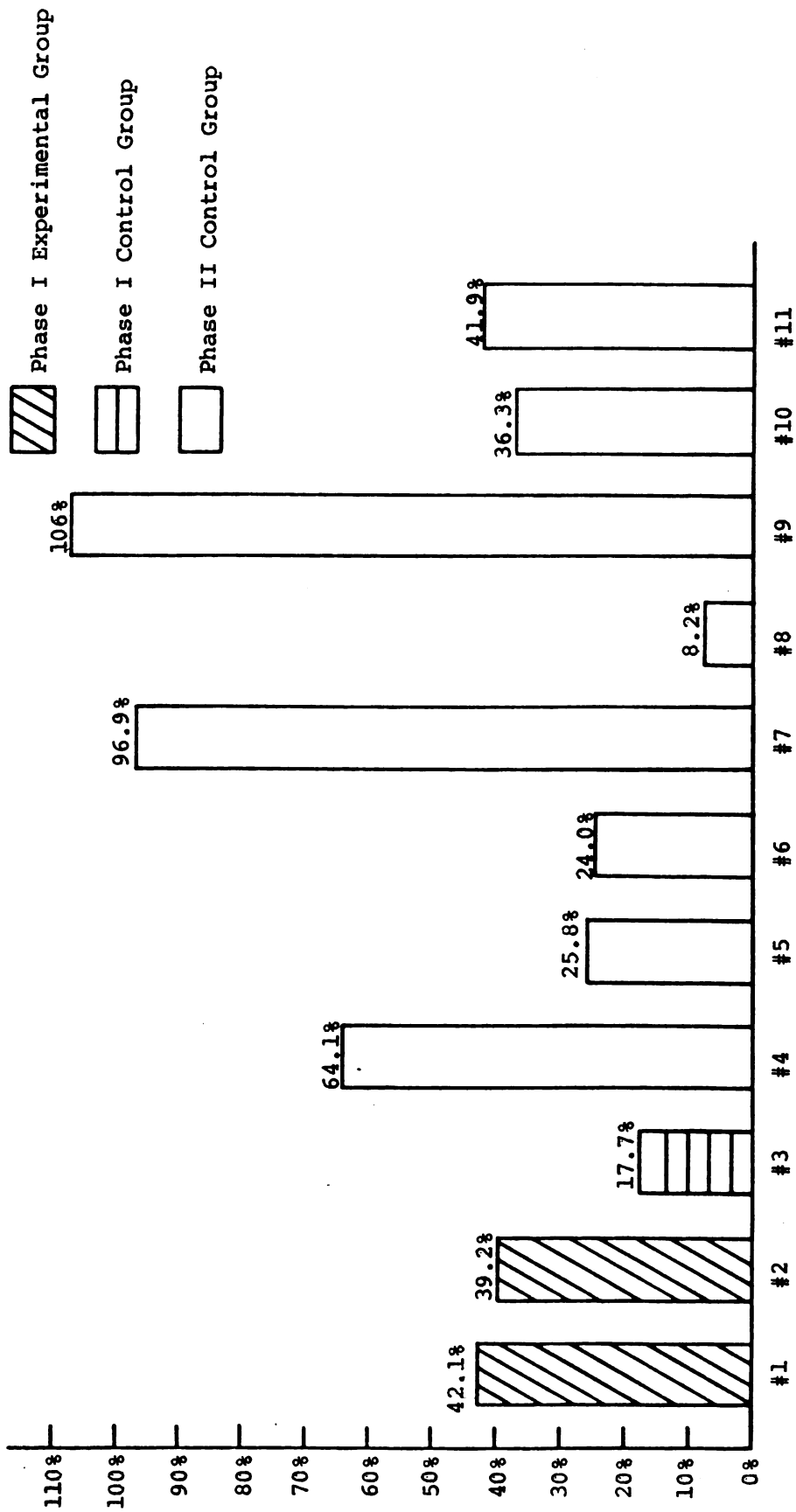
PERCENTAGE OF REQUIRED VOLUME

SUBJECT	RANGE	MEAN
1*	25-67%	42.1%
2*	17-67%	39.2%
		$\bar{x}$ = 40.7%
3*	0-60%	36.3%
4	22-100%	64.1%
5	0-67	25.8%
6	0-100%	24.0%
7	70-144%	96.9%
8	0-37%	8.2%
9	0-188%	106.0%
10	0-50%	17.7%
11	0-98%	41.9%
		$\bar{x}$ = 46.7%

*Phase I Subjects

FIGURE 1

MEAN PERCENTAGES OF REQUIRED VOLUMES



DESCRIPTION OF MATERNAL AND INFANT VARIABLES

The breast-feeding data of each mother-infant subject pair was examined in relation to maternal and infant variables in order to describe the factors which may have had an effect on the breast-feeding achievement of the infants and to compare the experiences of these mothers and infants with those reported by Auerbach and Avery. These variables were maternal parity and prior experience with breast-feeding, the maternal-infant variable of frequency of breast-feeding, and the infant variables of sex, severity of clinical course, gestational age, birthweight, and of age, postconceptual age, and weight at the initiation of breast-feeding. In particular, the records of infants #7 and #9, who demonstrated the ability to take the required volume of milk from the breast consistently, and those of infants #3, #5, #6 and #8, whose mean percentages of the required volume were appreciably lower than the mean of the control group, were examined in order to determine in what ways these mother-infant subject pairs may have been different from the others in the study.

Auerbach and Avery made no reference to maternal parity and prior breast-feeding experience as variables possibly associated with breast-feeding ability. In this study, no trends associated with these variables are apparent. Mother #7 was primiparous; mother #9 had one other child. Neither of these mothers had prior breast-feeding experience. The background of mother #5 is unknown to the investigator because it was not available in the infant's chart. Mothers #6 and #8 were primiparous and therefore had no prior experience with breast-feeding. Mother #3 had one other child whom she had breast-fed. The lack of apparent trends associated with maternal parity and prior

breast-feeding experience may be due to the small sample size in this study.

The frequency with which mothers were able to breast-feed their infants is another variable unmentioned by Auerbach and Avery. In this study, mother #7 breast-fed her infant twice every day, and mother #9 breast-fed her infant almost every day. Mothers #3 and #5 breast-fed their infants daily, but mothers #6 and #8 frequently were absent from the nursery for several days at a time.

Sex of the infant is another variable not addressed by Auerbach and Avery. Two of the mothers in this study, #5 and #8, discontinued breast-feeding before their infants were discharged from the nursery; both their infants were male. The two other infants who achieved very low mean percentages, #3 and #6, were also male. However, infant #9, who achieved the highest mean percentage of the required volume per feeding, was male. Infant #7, who consistently took a high percentage of the required volume from the breast, was female, but the four remaining female infants achieved mean percentages below the mean of the group.

Most of the infants in the study had mild clinical courses. The only infant in this study diagnosed as having severe illness was #8, one of the infants whose mother discontinued breast-feeding. The variable of severity of clinical course, which was not described by Auerbach and Avery, may be an important factor affecting the ability of the premature infant to breast-feed.

The ages at which infants in this study began breast-feeding differed from the sample studied by Auerbach and Avery. In their study, most of the premature infants weighing more than 1815gm at birth began

breast-feeding before four weeks of age. Most of those weighing between 1360 and 1815gm at birth began breast-feeding between four and seven weeks, and most of those infants with birthweights less than 1360gm did not begin breast-feeding until after eight weeks of age. In comparison, none of the infants in this study began breast-feeding later than seven weeks of age. Most of the infants, with birthweights ranging from 1220 to 1800gm, began breast-feeding before four weeks of age. Only four infants in this study, three of whom weighed less than 1360gm at birth, bid not begin breast-feeding by four weeks of age. In this small sample, there is a trend to earlier breast-feeding than has previously been reported.

Willingness to accept the breast was reported by Auerbach and Avery to be least when infants were first breast-fed prior to four weeks of age or after eight weeks of age. In this study, the infants who achieved the highest mean percentages of required volume during breast-feeding represented the extremes of age in the sample at the beginning of breast-feeding. For example, infant #7 was oldest at 47 days; infant #9 was youngest at 10 days of age. Three of the infants who began breast-feeding between four and seven weeks of age, #3, #5 and #6, were among the infants whose mean percentages of volume were lowest in the sample. This is in contrast to previous findings and may be a result of the small sample size.

Auerbach and Avery reported an increase over time in infant willingness to breast-feed. In this study, only one infant, #9, did not show initial acceptance of the breast as demonstrated by a measurable amount of milk ingested during the feedings. There were no patterns of increased willingness or ability shown by the infants in

this sample. Each infant showed variations within a consistent individual range. This pattern of consistency is contrary to the assumptions held by most health professionals concerning the development of breast-feeding skills in the premature infant.

Postconceptual age is a variable not mentioned by Auerbach and Avery. Three of the infants in this study with the lowest mean percentages of volume per feeding were in the extreme ranges of postconceptual age at the initiation of breast-feeding. Infant #8 had a postconceptual age of 32 weeks; infants #3 and #5 had postconceptual ages of 37 and 38 weeks, respectively. The postconceptual ages of infants #7 and #9 were in the middle range, 36 and 33 weeks, respectively. These results may be the result of the small sample, but they may indicate that there is an optimal postconceptual age to begin breast-feeding.

In the sample studied by Auerbach and Avery, infants of the highest and lowest gestational age groups, as estimated by birthweight, were less willing to breast-feed than those in the middle range. In this study, infants #7 and #9, those who achieved the highest mean percentages of volume, represented the extremes of gestational age, 29 and 32 weeks, respectively. The infants who did less well were also in both gestational age groupings. This may be a result of the small sample size, but it may indicate that gestational age is less important to the process of breast-feeding the premature infant than other variables.

Weights of infants in this study at the initiation of breast-feeding ranged from 1280 to 1930g. Infant #8, one of those achieving the lower mean percentages of volume, was the only infant weighing less

than 1360gm at the beginning of breast-feeding. Infants #3, #5 and #6, other infants who had low mean percentages, were in the middle weight range, from 1360 to 1815gm, as was infant #9, the infant with the highest mean percentage in the sample. Infant #7 was in the group of infants weighing more than 1815gm at the initiation of breast-feeding. The apparent lack of trend associated with weight at initiation of breast-feeding may suggest that weight is not closely associated with ability to breast-feed but may also be the result of the small sample size.

Birthweight, the variable used by Auerbach and Avery to classify the infants in their sample, may have been a factor in the ability of infants in this study to breast-feed. The birthweights of infants #5, #6 and #8 was below 1360gm. However, the birthweight of infant #7, one of the infants with a high mean percentage, was also below 1360gm. The birthweights of infants #3, one of the infants in the low mean percentage group, and #9, the infant with the highest mean percentage, were in the 1360 to 1815gm range. This trend of decreased breast-feeding ability associated with low birthweight may be the result of the small sample but may also reflect the findings of Auerbach and Avery's study of a larger sample.

CHAPTER V

DISCUSSION

CONCLUSIONS

There was a difference between premature infants in the experimental group, who had breast contact during tube-feedings and prior to bottle-feedings, and those in the control group, who had no breast contact, in the number of trial breast-feedings which occurred before the infants were able to take the required volume of milk per feeding from the breast during three out of four consecutive breast-feedings. However, due to the small sample size and the lack of statistical analysis because of the small number of subjects in the experimental group, the null hypothesis can not be accepted or rejected. It is impossible to determine whether the higher feeding volume percentages achieved by the infants in the control group are the result of lack of exposure to the independent variable or whether the experimental group volume percentages would have been equivalent or higher if the groups had contained equal numbers of subject pairs.

The data collected during the study demonstrates a wide range of breast-feeding experience occurring within a small sample matched for gestational age and clinical course. This data lends itself to speculation concerning the maternal and infant variables which may be factors affecting the premature infant's transition to breast-feeding.

The four infants who demonstrated the least breast-feeding ability were all males. Two of these infants were those whose mothers discontinued breast-feeding. Because morbidity and mortality rates are higher among premature male infants than among females, it may be

speculated that decreased strength and stamina may have been a factor affecting the ability of these infants to breast-feed. Three of these infants had very low birthweights, two were in the very lowest gestational age group, and one had the lowest weight and postconceptual age of the sample at initiation of breast-feeding. This would tend to support the conclusion that factors affecting strength of the infant also affect the infant's ability to breast-feed.

Frequency of breast-feeding practice, as suggested by learning theory, may also be an important factor in the premature infant's ability. Although two of the infants in this study with decreased breast-feeding ability were breast-fed daily or more often, two had infrequent breast-feeding practice. Both the infants who achieved the highest volume percentages were breast-fed frequently. One was breast-fed several times each day, and the other was breast-fed almost every day.

The age at which breast-feeding begins may be a very important variable. Three of the infants who demonstrated decreased ability to breast-feed did not begin breast-feeding until after four weeks of age. One of the infants with high volume percentages also did not have breast-feeding experience until after four weeks of age, but the infant with the highest mean percentage was also the youngest of the sample at the initiation of breast-feeding. This leads one to believe that early breast-feeding of the premature infant may have a positive effect on the infant's ability to breast-feed.

Severity of clinical course may be a variable affecting ability to breast-feed. The only infant in this sample who had been diagnosed as severely ill was one of the four infants who had lower

volume percentages. This infant was also the lowest weight and post-conceptual age of the sample at initiation of breast-feeding. This supports the earlier conclusion that factors affecting strength of the infant may also affect the infant's ability to breast-feed.

It might be expected that maternal parity and prior breast-feeding experience would decrease maternal anxiety during the transition to breast-feeding the premature infant and would therefore facilitate transition. However, in this study, no trend of increased breast-feeding ability was observed associated with these variables. A strong association might be observed in a larger sample, but it may be that prior maternal experience with the care of a full-term infant actually increases the mother's anxiety when she begins the care of a premature infant. Multiparous mothers frequently comment on the differences in size, strength and activity between their premature and full-term infants. The mother's perception of the premature infant as fragile and unlike a term infant may negate her confidence with infant care and breast-feeding. The lack of difference between infants of multiparous and primiparous mothers in this study may be due to the lack of difference in the mothers' levels of confidence regarding the care of the premature infant.

SIGNIFICANCE

Although the results of this study can not be generalized due to the small sample size and the lack of statistical analysis, the data collected during the study is significant because it has added to the store of nursing knowledge concerning the process of breast-feeding the premature infant. By adding to the body of descriptive knowledge

concerning this process, the study may facilitate the design of nursing interventions and further research.

Weight loss or gain is frequently used as a determination of infant tolerance of an intervention. The premature infants in the Phase I experimental group continued to gain weight appropriately during exposure to the independent variable. If the treatment had been stressful to the infants or required a greater energy expenditure on their part, weight loss or failure to gain should have been observed. The continued weight gain suggests that the treatment was well tolerated and that this method of transition to breast-feeding is a feasible nursing alternative. This method may be particularly appropriate when the mother of a premature infant is becoming increasingly discouraged due to the length of time which must elapse before her infant is able to breast-feed or if the mother's ability to lactate is diminished.

The data collected during the study demonstrates a wide range of breast-feeding experience and capability occurring within a small sample matched for gestational age and clinical course. This lack of homogeneity is significant and suggests that traditional beliefs concerning the lack of ability of the premature infant to breast-feed should be held to closer scrutiny.

Of additional significance is the pleasure the mothers in the experimental group experienced as the result of being able to put their infants to breast during the treatment period. Both mothers stated that even if the experimental procedure did not facilitate the transition to breast-feeding, they enjoyed having contact with their infants earlier than they normally would have. Each also stated that she found artificial expression of breast-milk easier after having her infant at

breast. Although the reaction of fathers to the procedure was not specifically looked at during the study, both experimental group fathers were enthusiastic about the treatment. They stated that they enjoyed watching their infants at the mother's breast and that they felt more closely involved with the infant when they were able to assist during breast contact periods by helping to position the infant on the breast and by holding the feeding syringe during tube-feedings.

IMPLICATIONS FOR NURSING

The wide range of breast-feeding experience found in the small sample of mother-infant pairs should be of particular concern for nurses caring for premature infants and their mothers. The infants' apparent lack of homogeneity concerning breast-feeding ability during transition to breast-feeding should act as a warning to avoid making assumptions regarding the premature infant's probable degree of breast-feeding success and to avoid communicating such assumptions to mothers who may be highly susceptible to suggestion during this critical period in their lives.

Nurses may also be well advised to intervene in the timing of the introduction of the premature infant to the mother's breast. Although this study shows no increase in facilitation of breast-feeding as a result of the experimental treatment, the pleasure the experimental subject mothers found in their earlier breast contact experience may be a positive factor in the enhancement of the maternal-infant attachment process for this high-risk population. If the treatment described in this study is not appropriate for a particular mother-infant pair, perhaps another mode of early breast contact designed by the nurse in

clinical practice would impact favorably on the attachment process.

The implication of this study for nursing education is that nurses must be taught to look for alternative interventions when current practice seems to be less effective than desired. As the primary care-givers in the health profession, nurses are often more aware than other health professionals of the gap between reality and the desired outcome in patient care. By remaining alert to opportunities to design interventions which may improve patient care and by carefully assessing the effectiveness of traditional and innovative care practices, the nurse will improve her practice and help close the gap between the desired outcome and reality.

RECOMMENDATIONS FOR FUTURE RESEARCH

Before further research is done concerning methods of facilitating the transition to breast-feeding for the premature infant, it may be appropriate to ascertain through comparison of full-term and premature infants and their mothers whether breast-feeding the premature infant is indeed less easily accomplished and, if so, to what extent prematurity is a factor. If breast-feeding the premature infant is shown to be more difficult, prospective experimental studies with random assignment of large numbers of subject pairs to experimental and control groups should be done to determine the effectiveness of recommended nursing interventions such as early contact and the use of the Lact-Aid supplementation device. A descriptive survey of mothers currently breast-feeding premature infants would be of interest, as would research directed toward discovering possible correlations between breast-feeding the premature infant and decreased incidence of

CONSENT TO BE A RESEARCH SUBJECT

Study No. 938305-01 Subject No. _____

Linda Taylor is a nurse doing graduate work at the School of Nursing, University of California, San Francisco. She is doing a study to learn the best time to start breast-feeding a premature infant. Currently, such infants are not put to the breast until they are bottle-feeding well and tube-feeding is no longer necessary.

If I agree to be in the study, I will come to the nursery during feeding time at least once each day. I will hold my baby while he or she is being tube-fed, and I may or may not be asked to put my baby to my breast during this time.

Babies this young sometimes lose their body heat while they are being held. This is the biggest risk to my baby. A warming blanket will be used, and the nurses and doctors will check the baby's heat. Another possible risk is loss of my privacy. The data will be kept by numbers, and the code will be protected as much as possible.

There may be no benefit to me or my baby from being in this study. The study may yield information about the best time for premature infants to start breast-feeding.

I have talked with Linda Taylor about this study, and she has answered my questions. If I have other questions I may call her at .

I have been offered a copy of this consent form and a copy of the Experimental Subject's Bill of Rights to keep.

Participation in any research is voluntary. I have the right to refuse or to withdraw at any time without jeopardy to the treatment my baby or I receive in the hospital. I just have to say so.

_____ _____

Date Subject Signature

10/27/80

BREAST CONTACT FORM SUBJECT NO. _____

Please record all data each time the infant is put to breast.

DATE	WEIGHT	AGE	REQUIRED VOLUME	TIME	MINUTES OF BREAST CONTACT	ac/pc WEIGHT GAIN	CHECK TYPE OF CONTACT		
							TUBE	ac/NIP	TRIAL

BREAST CONTACT FORM

SUBJECT NO. 1

Phase I Experimental

Please record all data each time the infant is put to breast.

DATE	WEIGHT	AGE	REQUIRED VOLUME	TIME	MINUTES OF BREAST CONTACT	ac/pc WEIGHT GAIN	CHECK TYPE OF CONTACT		
							TUBE	ac/NIP	TRIAL
11-9-80	1590	20d	28q2	4P	6		x		
10	1660	21	32q3	2P	5		x		
11	1690	22	36q3	8P	5	0		x	
12	1700	23	"	2P	5	0		x	
"	"	"	"	8P	5	0		x	
13	1710	24	"	2P	5	10		x	
14	1760	25	"	"	5	0		x	
15	1810	26	36	"	30	10			x
16	1810	27	36	"	"	15			x
17	1840	28	"	"	"	10			x
18	1850	29	"	"	"	15			x
19	1860	30	40	"	"	15			x
20	1870	31	"	"	"	20			x
21	1920	32	"	"	"	10			x
22	1930	33	"	"	"	15			x
23	1930	34	"	"	"	10			x
24	1980	35	45	"	"	10			x
25	2020	36	"	"	"	15			x
26	2030	37	"	"	"	30			x
27	2030	38	"	"	"	30			x
28	2050	39	"	"	"	30			x

BREAST CONTACT FORM SUBJECT NO. 1

Please record all data each time the infant is put to breast.

DATE	WEIGHT	AGE	REQUIRED VOLUME	TIME	MINUTES OF BREAST CONTACT	ac/pc WEIGHT GAIN	CHECK TYPE OF CONTACT		
							TUBE	ac/NIP	TRIAL
29	2080	40	45	2P	30	20			x
30	2120	41	50	"	"	20			x
12-1	2120	42	"	"	"	30			x
2	2150	43	Discharged						

BREAST CONTACT FORM

SUBJECT NO. 2

Phase I Experimental

Please record all data each time the infant is put to breast.

DATE	WEIGHT	AGE	REQUIRED VOLUME	TIME	MINUTES OF BREAST CONTACT	ac/pc WEIGHT GAIN	CHECK TYPE OF CONTACT		
							TUBE	ac/NIP	TRIAL
2-15-81	1420	15d	25q2	8P	5		x		
16	1460	16	"	"	6		x		
17	1500	17	"	4P	5		x		
"	"	"	"	8P	5		x		
18	1500	18	35q3	5P	5	0		x	
"	"	"	"	8P	5	0		x	
19	1510	19	"	5P	5	0		x	
20	1560	20	"	"	5	5		x	
21	1560	21	"	"	5	0		x	
22	1610	22	40	"	5	0		x	
23	1640	23	"	9P	5	0		x	
24	1650	24	43	5p	5	5		x	
25	1650	25	"	1P	5	5		x	
26	1660	26	45	5P	30	15			x
27	1720	27	"	9P	"	10			x
28	1720	28	"	11A	"	20			x
3-1-81	1730	29	"	2p	"	20			x
2	1760	30	"	2P	"	10			x
3	1780	31	60	11A	"	30			x
4	1860	32	"	2P	"	35			x
5	1900	33	"	5P	"	40			x

BREAST CONTACT FORM SUBJECT NO. 2

Please record all data each time the infant is put to breast.

DATE	WEIGHT	AGE	REQUIRED VOLUME	TIME	MINUTES OF BREAST CONTACT	ac/pc WEIGHT GAIN	CHECK TYPE OF CONTACT		
							TUBE	ac/NIP	TRIAL
3-6-81	1915	34d	60	9P	30	10			x
"	"	"	"	12M	"	30			x
7	1980	35	"	10A	"	25			x
"	"	"	"	2P	"	10			x
"	"	"	"	6P	"	15			x
8	2020	36	"	9A	"	35			x
			~~Discharged~~						

BREAST CONTACT FORM

SUBJECT NO. 3

Phase I Control

Please record all data each time the infant is put to breast.

DATE	WEIGHT	AGE	REQUIRED VOLUME	TIME	MINUTES OF BREAST CONTACT	ac/pc WEIGHT GAIN	CHECK TYPE OF CONTACT		
							TUBE	ac/NIP	TRIAL
11-17-80	1700	43d	39	2P	30	5			x
18	1740	44	"	2P	"	0			x
19	1740	45	"	12N	"	5			x
20	1750	46	"	8A	"	0			x
"	"	"	"	2P	"	10			x
21	1770	47	"	12N	"	5			x
"	"	"	41	6P	"	10			x
22	1790	48	"	8A	"	5			x
"	"	"	"	6P	"	20			x
23	1790	49	"	6P	"	10			x
24	1810	50	"	11A	"	5			x
"	"	"	"	6P	"	5			x
25	1860	51	"	6P	"	0			x
26	1865	52	"	9A	"	10			x
27	1880	53	"	9A	"	10			x
"	"	"	"	6P	"	10			x
28	1880	54	"	9A	"	20			x
"	"	"	"	6P	"	0			x
29	1930	55	44	9A	"	10			x
"	"	"	"	6P	"	20			x
30	2000	56	50	12N	"	10			x

BREAST CONTACT FORM SUBJECT NO. 3

Please record all data each time the infant is put to breast.

DATE	WEIGHT	AGE	REQUIRED VOLUME	TIME	MINUTES OF BREAST CONTACT	ac/pc WEIGHT GAIN	CHECK TYPE OF CONTACT		
							TUBE	ac/NIP	TRIAL
11-30-80	2000	56	50	6P	30	25			x
12-1-80	2000	57	"	12N	"	10			x
"	"	"	"	6P	"	10			x
2	2030	58	"	9A	"	10			x
"	"	"	"	6P	"	5			x
3	2090	59	"	12N	"	0			x
4	2140	60	"	6P	"	5			x
5	2140	61	"	6P	"	10			x
6	2180	62	Discharged						

BREAST CONTACT FORM

SUBJECT NO. 4

Phase II Control

Please record all data each time the infant is put to breast.

DATE	WEIGHT	AGE	REQUIRED VOLUME	TIME	MINUTES OF BREAST CONTACT	ac/pc WEIGHT GAIN	CHECK TYPE OF CONTACT		
							TUBE	ac/NIP	TRIAL
12-7-79	1930	27	45		30	10			x
8	1960	28	"		"	25			x
9	1980	29	"		"	35			x
10	2020	30	"		"	25			x
11	2020	31	"		"	20			x
12	2050	32	50		"	30			x
13	2100	33	"		"	40			x
14	2165	34	"		"	25			x
15	2220	35	"		"	40			x
16	2270	36	"		"	30			x
17	2280	37	60		"	60			x
18	2290	38	"		"	50			x
19	2370	39	Discharged						

BREAST CONTACT FORM

SUBJECT NO. 5

Phase II Control

Please record all data each time the infant is put to breast.

DATE	WEIGHT	AGE	REQUIRED VOLUME	TIME	MINUTES OF BREAST CONTACT	ac/pc WEIGHT GAIN	CHECK TYPE OF CONTACT		
							TUBE	ac/NIP	TRIAL
2-3-80	1705	41	30		30	10			x
4	1720	42	30		"	0			x
5	1725	43	"		"	10			x
6	1750	44	"		"	20			x
7	1805	45	"		"	10			x
8	1815	46	45		"	30			x
9	1875	47	"		"	15			x
10	1905	48	"		"	10			x
11	1950	49	"		"	10			x
12	1990	50	"		"	0			x
13	2030	51	"		"	0			x
14	2030	52	"		"	0			x
15	2100	53	Discontinued breast-feeding						
18	2180	56	Discharged						

BREAST CONTACT FORM

SUBJECT NO. 6

Phase II Control

Please record all data each time the infant is put to breast.

DATE	WEIGHT	AGE	REQUIRED VOLUME	TIME	MINUTES OF BREAST CONTACT	ac/pc WEIGHT GAIN	CHECK TYPE OF CONTACT		
							TUBE	ac/NIP	TRIAL
3-12-80	1450	41d	23q2		30	10			x
"	"	"	"		"	5			x
14	1490	43	24q2		"	0			x
18	1580	47	36q3		"	15			x
19	1630	48	37		"	0			x
21	1700	50	"		"	0			x
22	1720	51	38		"	0			x
25	1790	54	40		"	40			x
28	1880	57	42		"	10			x
29	1920	58	"		"	10			x
31	1990	60	"		"	0			x
4-1	2030	61	45		"	10			x
2	2060	62	60		"	20			x
6	2220	66	Discharged						

BREAST CONTACT FORM

SUBJECT NO. 7

Phase II Control

Please record all data each time the infant is put to breast.

DATE	WEIGHT	AGE	REQUIRED VOLUME	TIME	MINUTES OF BREAST CONTACT	ac/pc WEIGHT GAIN	CHECK TYPE OF CONTACT		
							TUBE	ac/NIP	TRIAL
6-29-80	1870	47d	40		30	40			x
"	"	"	"		"	40			x
30	1900	48	43		"	50			x
"	"	"	"		"	30			x
7-1	1910	49	"		"	40			x
"	"	"	"		"	40			x
"	"	"	"		"	35			x
2	1945	50	45		"	50			x
"	"	"	"		"	50			x
"	"	"	"		"	35			x
3	1955	51	"		"	45			x
"	"	"	"		"	65			x
"	"	"	"		"	35			x
4	2015	52	55		"	55			x
"	"	"	"		"	45			x
5	2060	53	"		"	60			x
"	"	"	"		"	45			x
6	2110	54	Discharged						

BREAST CONTACT FORM

SUBJECT NO. 8

Phase II Control

Please record all data each time the infant is put to breast.

DATE	WEIGHT	AGE	REQUIRED VOLUME	TIME	MINUTES OF BREAST CONTACT	ac/pc WEIGHT GAIN	CHECK TYPE OF CONTACT		
							TUBE	ac/NIP	TRIAL
9-2-80	1280	23d	18q2		30	5			x
4	1320	25	"		"	5			x
5	1350	26	"		"	0			x
8	1400	29	20q2		"	0			x
11	1480	32	"		"	0			x
14	1550	35	24q2		"	0			x
15	1600	36	"		"	0			x
16	1640	37	"		"	0			x
17	1660	38	27q2		"	0			x
18	1680	39	"		"	10			x
22	1830	43	45q3		"	0			x
			Discontinued breast-feeding						
10-6	2180	57	Discharged						

BREAST CONTACT FORM

SUBJECT NO. 9

Phase II Control

Please record all data each time the infant is put to breast.

DATE	WEIGHT	AGE	REQUIRED VOLUME	TIME	MINUTES OF BREAST CONTACT	ac/pc WEIGHT GAIN	CHECK TYPE OF CONTACT		
							TUBE	ac/NIP	TRIAL
9-9-80	1510	10d	24q2		30	0			x
10	1540	11	"		"	0			x
11	1590	12	"		"	25			x
12	1620	13	27q2		"	30			x
14	1680	15	28q2		"	25			x
15	1700	16	"		"	30			x
16	1740	17	30q3		"	20			x
17	1750	18	34		"	30			x
19	1820	20	"		"	40			x
20	1840	21	36		"	40			x
22	1880	23	40		"	75			x
23	1930	24	45		"	60			x
24	1980	25	"		"	40			x
25	1980	26	"		"	70			x
26	2020	27	"		"	70			x
27	2060	28	"		"	70			x
28	2080	29	50		"	50			x
29	2120	30	Discharged						

BREAST CONTACT FORM SUBJECT NO. 10

Phase II Control

Please record all data each time the infant is put to breast.

DATE	WEIGHT	AGE	REQUIRED VOLUME	TIME	MINUTES OF BREAST CONTACT	ac/pc WEIGHT GAIN	CHECK TYPE OF CONTACT		
							TUBE	ac/NIP	TRIAL
1-17-81	1840	16d	44		30	20			x
19	1860	18	"		"	25			x
21	1930	20	46		"	10			x
22	1960	21	"		"	20			x
23	1970	22	"		"	20			x
24	2000	23	"		"	0			x
25	2040	24	50		"	30			x
26	2060	25	"		"	10			x
27	2120	26	Discharged						

BREAST CONTACT FORM

SUBJECT NO. 11

Phase II Control

Please record all data each time the infant is put to breast.

DATE	WEIGHT	AGE	REQUIRED VOLUME	TIME	MINUTES OF BREAST CONTACT	ac/pc WEIGHT GAIN	CHECK TYPE OF CONTACT		
							TUBE	ac/NIP	TRIAL
2-20-81	1860	16d	46		30	20			x
21	1900	17	"		"	0			x
"	"	"	"		"	30			x
22	1930	18	"		"	0			x
"	"	"	"		"	10			x
23	1960	19	"		"	20			x
24	1980	20	"		"	45			x
25	1960	21	"		"	20			x
26	2010	22	50		"	40			x
27	2020	23	"		"	20			x
28	2050	24	"		"	40			x
"	"	"	"		"	0			x
"	"	"	"		"	30			x
3-1	2070	25	"		"	30			x
2	2110	26	55		"	20			x
3	2120	27	"		"	0			x
4	2180	28	Discharged						

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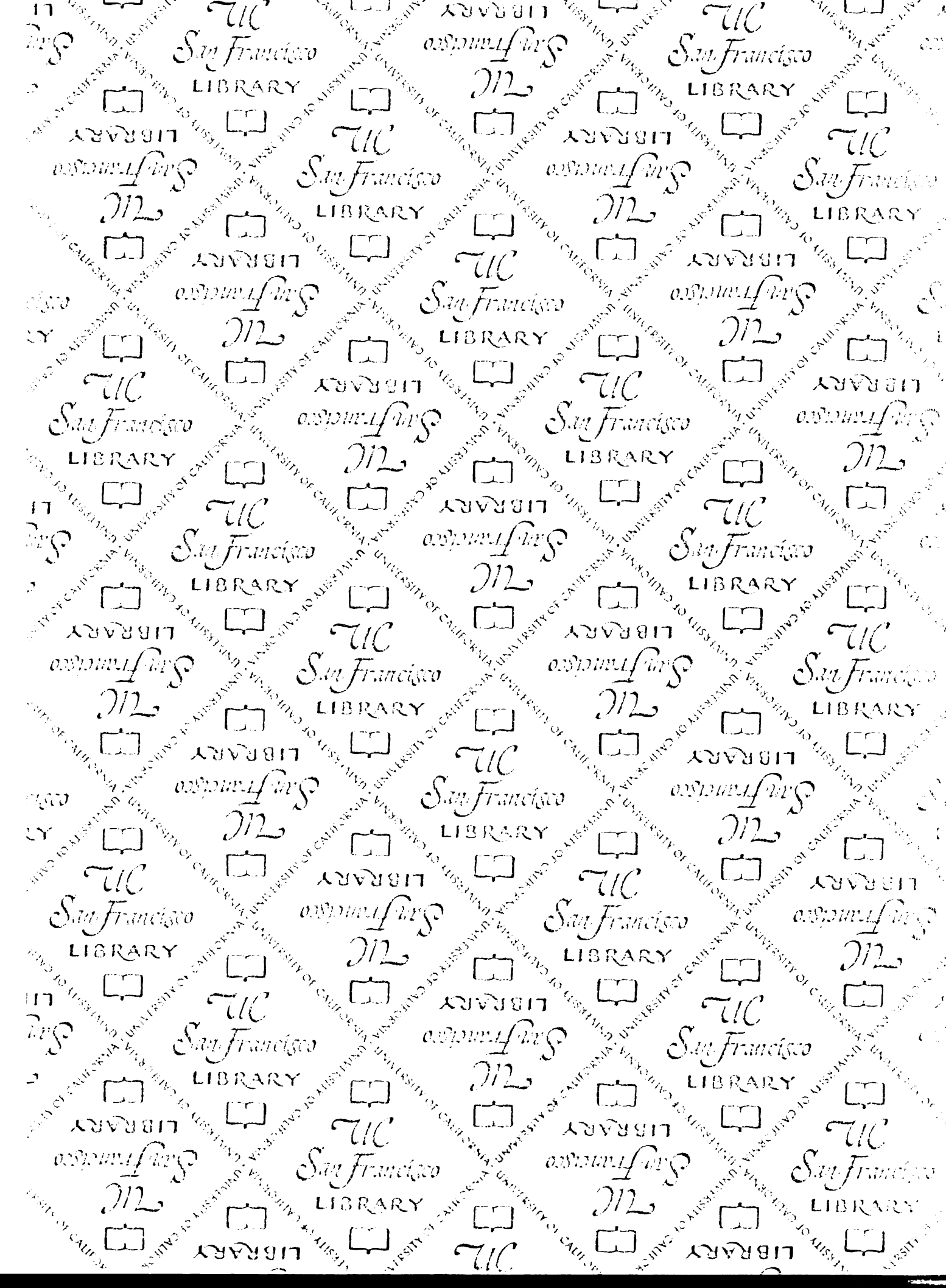
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