

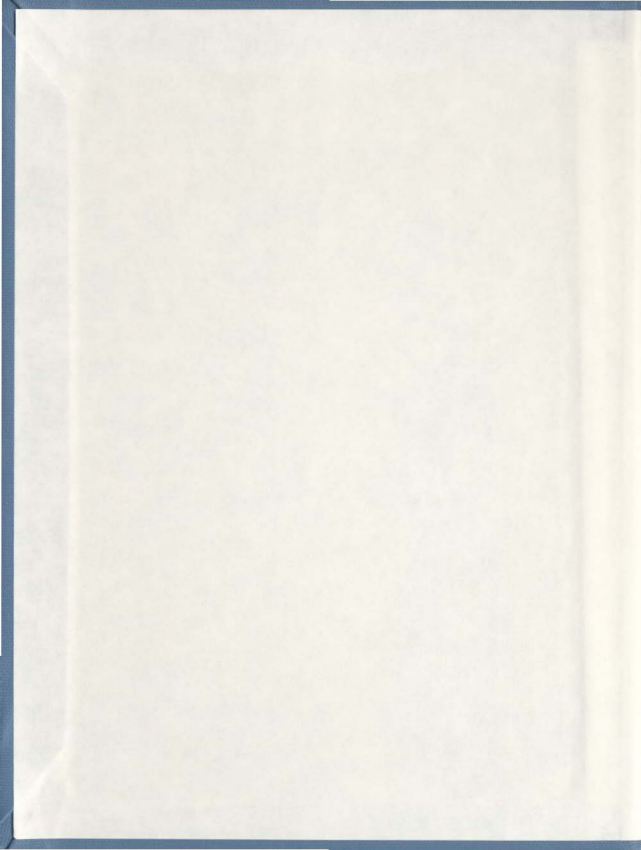
THE RELATIONSHIP BETWEEN MATERNAL LABOUR
ANALGESIA AND INFANT BREASTFEEDING IN
THE FIRST FOUR DAYS AFTER BIRTH

CENTRE FOR NEWFOUNDLAND STUDIES

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MARY KATHLEEN MATTHEWS



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THE RELATIONSHIP BETWEEN MATERNAL LABOUR ANALGESIA AND
INFANT BREASTFEEDING IN THE FIRST FOUR DAYS AFTER BIRTH

© Mary Kathleen Matthews, R.N., S.C.M., B.N.

A thesis submitted to the School of Graduate Studies in
partial fulfillment of the requirements for the degree of
Master of Nursing

School of Nursing
Memorial University of Newfoundland
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ABSTRACT

The Relationship between Maternal Labour Analgesia and
Infant Breastfeeding in the First Four Days After Birth

This prospective ex post facto study explored the relationship between two commonly used labour analgesics, meperidine and alphaprodine, and delay in establishing effective breastfeeding in healthy neonates from birth to four days post-birth.

The major purposes of the study were to describe the pattern of initiation of breastfeeding in healthy neonates whose mothers received no analgesia in labour and to compare the patterns of initiating breastfeeding in babies of mothers who received no medication in labour with those babies whose mothers received labour analgesic medication.

Infant suckling was assessed by an Infant Breastfeeding Assessment Tool (IBFAT). The IBFAT is a new instrument which was developed for the purpose of the study to assess and measure infant breastfeeding competence.

The subjects of the study were 60 healthy, fullterm newborn infants who were delivered spontaneously following uncomplicated labours and deliveries. Selection was on an as-they-come basis on admission to the well-baby nursery. Final sample was 86.9% of the total eligible population.

The IBFAT was completed by the mother for every feeding and by the researcher at some randomly selected feedings until effective feeding was established. Inter-rater

reliability was assessed by comparing the researcher's scores with the mother's scores. Inter-rater reliability was 91%.

The researcher was blind to the medication status of each baby until data collection was completed. Following completion of data collection the babies were divided into three groups depending upon whether or not medication had been administered to the mother. The final groups were two medicated groups and one non-medicated comparison group.

First, a descriptive analysis was done on the pattern of initiation of breastfeeding in babies of unmedicated mothers. Then the hypothesis, that babies of mothers who received analgesia during labour would take longer to establish effective breastfeeding than babies of unmedicated mothers, was tested with oneway analysis of variance and Dunnett's t-test. To rule out parity as a confounding variable, the analysis was repeated on the babies of multiparous mothers only in the alphaprodine ($n = 20$) and the non-medicated ($n = 18$) groups.

The results of the study showed that 66.6% of babies of mothers who received no analgesia during labour were breastfeeding effectively by 17.5 hours after birth and that 85.7% had established breastfeeding by 24 hours. A statistical analysis of inter-group scores in both the mixed parity and the multiparous only groups, suggested that babies of mothers who received a standard dose of analgesic medication within one to four hours prior to delivery took

significantly longer to establish effective breastfeeding than those whose mothers received no medication. There was no statistically significant difference when the mother received the medication within one hour prior to delivery. Babies of primiparous mothers took significantly longer than babies of multiparous mothers in all groups. A number of possible explanations are advanced for this result.

Delay in initiation of breastfeeding has potentially deleterious effects on both mother and baby. From the results of the study a number of suggestions for further nursing research, practice and education are put forward.

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CHAPTER I
PROBLEMS AND PURPOSES

C One of the primary functions of the nurse in the post-partum period is to assist, counsel and support mothers during the initiation period of breastfeeding. The initiation period can be critical to breastfeeding success since positive experiences at this time appear to make a difference to the mother's motivation to continue breastfeeding (de Chateau and Winberg, 1978) and have been correlated with longer duration of breastfeeding and greater maternal satisfaction (Fisher, 1984; Johnson, 1976; Salariya, Easton & Cater, 1978;). Conversely, delay in the initiation of breastfeeding and feeding difficulties in the neonatal period can lead to discouragement and anxiety in the mother which can contribute to breastfeeding failure (Ladas, 1972; Lawson, 1976).

A number of conditions can occur, in either the mother or the baby in the period immediately following birth which may affect the early initiation of breastfeeding. Maternal illness, birth complications requiring operative delivery, and maternal analgesia and anesthesia are some of the factors which affect the mother and directly or indirectly the baby. If the infant is pre-term, ill or suffering from a congenital anomaly which prevents normal feeding, breastfeeding may have to be delayed until the baby's condition has improved.

A major feature of the early post-partum period is that it is a period of adaptation for mother and baby. If it is the mother's first breastfeeding experience it is also a learning period. During this time, the woman learns the techniques of breastfeeding, her infant's individual behaviour patterns and his or her responses to feeding. Depending upon the quality of the experiences, she begins to develop self-confidence in her mothering role.

State is a point along the continuum of alertness or consciousness ranging from vigorous activity to regular sleep (Hetherington & Parke, 1979). The developmental task of the healthy term newborn is that of increasing differentiation and control of state (Als, 1978). In a reciprocal manner the mother's task is to facilitate the baby's state modulation by gearing her behaviour to her baby's state (Sander, 1962). Because the newborn is structured to place demands upon the caregiver to supply the organization that is lacking, "mothers of babies disorganized at the start may come to perceive them as especially difficult to care for and behave in a manner that will confirm and reinforce their expectations" (Als, 1978, p. 72).

Experts in child development consider the immediate post-partum period to be a unique time in which parents learn skills which assist them to interact with their baby so that the time spent together can be mutually reinforcing

and pleasurable (Wilson, 1980, p. 409). Piaget (1960) considered that for the baby this is also a learning period in which certain behaviours, which are reflexly organized at first, become stabilized through repetition. The alert, responsive baby will suck anything which touches his lips and quickly learns the type of sucking which brings him or her milk. The newborn also quickly learns to discriminate between different tastes and concentrations of sweet solutions and quickly develops preferences for milk (Desor, Maller & Turner, 1973). Thus the earlier the baby learns and practices the type of sucking activity which brings milk from the breast, the earlier more effective and satisfying breastfeeding will be established.

Newton and Newton (1967) have described breastfeeding as "a co-operative process between two people; smooth function depends as much on the behaviour of the baby as on the behaviour of the mother" (p. 1182). Piaget also stresses the importance of the baby as the agent, who, by his or her behaviour elicits the type and quality of the caretaking responses from the mother (Piaget, 1960). If the baby and his or her responses to the feeding situation are key reinforcers to the mother to continue breastfeeding, any factors, which may interfere with the baby's responses to breastfeeding, may have important implications for breastfeeding success.

Problem Statement

In clinical practice the nurse encounters a number of babies who are initially slow to breastfeed. The most common problem which delays the establishment of successful breastfeeding and which has implications for breastfeeding success or failure is that of the healthy neonate who is too sleepy to breastfeed or who, although alert, breastfeeds poorly in the first few days after birth. The infant's inability to feed may undermine the mother's confidence in her ability to breastfeed successfully and can be frustrating and discouraging, especially if she sees other babies, or her own baby, taking milk solutions or water more easily from a bottle. In the absence of other health-related problems a factor that has been implicated in delaying the baby's response to feeding is maternal labour analgesia.

If the baby is unable to feed effectively in the first few days after birth there may be a higher than average decrease in infant weight from the initial birth weight and the baby may become dehydrated. Often this leads to subtle and not-so-subtle pressures being placed on the mother to offer the baby a supplement of formula or glucose water from a bottle. However, offering a bottle to a breastfeeding baby creates other problems which interfere with the development of effective suckling. This is because the suckling action of the breastfeeding baby is different and more complex than the sucking action of the baby feeding from the bottle.

Suckling activity is usually preceded by rooting, the action of opening the mouth and turning towards the nipple. In suckling, the tongue thrusts forward to grasp the nipple and areola. As the tongue pulls backward, bringing the areola into the mouth, the nipple is brought against the hard palate. A true sucking action is created by the action of the tongue and cheeks against the nipple. In contrast, the large rubber nipple of a bottle strikes the soft palate and interferes with the action of the tongue. The tongue moves forward against the gum to control the flow of milk into the oesophagus (Applebaum, 1970). The suckling of the breastfeeding baby requires more effort on the part of the baby, and the baby must be alert, ready to root and suck. Babies, whether bottlefed or breastfed, quickly learn the sucking mechanisms which brings them milk. Problems can arise if the baby is not sufficiently alert to suck on the mother's nipple and is given a supplement of water or formula from the bottle. The baby may refuse the mother's nipple in favor of the easier rubber nipple, thus compounding the problem.

Suckling is considered the key event in the production of breast milk (Howie, 1985). The absence of suckling or weak sucking affects not only the baby's milk intake but also the production of milk. Studies have demonstrated the importance of suckling on the prolactin response. Prolactin levels of mothers with premature infants who were using a

breast pump to collect their milk were measured and compared with mothers who could suckle their infants. The pump failed to induce the prolactin response (Howie, McNeilly, McArdle, Smart & Houston, 1980). Thus suckling-induced prolactin release is the physiological stimulus upon which successful lactation depends.

When there is a delay in the onset of effective feeding, the mother and baby may be discharged home just as the baby is beginning to feed well, but before lactation is completely established and before feeding problems are resolved. Depending upon the amount of support available at home, the problems may persist leading to lactation failure and discontinuation of breastfeeding within the first month following hospital discharge (Yeung, Pennell, Leung & Hall, 1981).

Although sleepiness at feeding can also be a problem for the bottlefeeding baby, techniques to encourage the baby to swallow from the bottle by manipulating the artificial nipple in the baby's mouth throughout the feeding can be used with effect. These techniques are not feasible for the breastfeeding baby who must be alert enough to grasp the nipple and suck.

What causes infant-related difficulties with breastfeeding? Some causes may be related to anatomical difficulties which prevent effective fixing on the nipple and become evident when the baby tries to feed, but the

majority of reasons relate to problems in infant state and responsiveness. A number of studies have documented the effects of analgesia or anesthesia given to the mother in labour on the neurobehaviour of otherwise healthy newborn infants (Böwes, Brackbill, Conway & Steinschneider, 1970; Brackbill, Kane, Maniello & Abramson, 1974; Brazelton, 1961, 1970; Brazelton & Robey, 1965; Corke, 1977; Hodgkinson, Bhatt & Wang, 1978). Kron, Stein and Goddard (1966) have demonstrated depression of the sucking reflex and sucking pressures for up to five days post-partum in neonates whose mothers received barbiturates in labour. Other studies which have investigated the state of alertness in the newborn infant following maternal labour analgesia conclude that there is a reduction in the state of alertness for varying periods after birth (Böwes, Brackbill, Conway & Steinschneider, 1970; Stechler, 1964). Most of the studies of the effects of maternal obstetric medication in labour on infant outcome have been more concerned with neurobehavioural changes in general rather than infant feeding behaviours in particular. Relatively few studies have investigated sucking behaviour, and even fewer have examined the effect on breastfeeding.

The lack of research on the effects of maternal labour medication on breastfeeding may be due to methodological difficulties. Most studies of infant neurobehaviour have used the Neonatal Behaviour Assessment Scale (Brazelton,

1973) or the Early Neonatal Neurobehavioural Scale (ENNS) developed by Scanlon (Scanlon, Brown, Weiss & Alper, 1974). Both of these assessment tools measure sucking by inserting a finger into the infants mouth. Sucking measurement devices are available which measure sucking pressures but these are similar to the artificial nipple and are not appropriate to measure suckling activity in the breastfed baby who must be alert enough to root and fix on the mother's nipple. However, assessment with these tools has demonstrated a reduced sucking pressure and a weaker sucking action in newborns whose mothers received analgesics compared with those who received only regional anesthesia such as epidural blocks (Brazelton, 1961).

Brazelton (1961) examined the effect of labour medication on breastfeeding. using the observations of the mothers to assess infant breastfeeding effectiveness and found that the mothers in the non-analgesic group reported that feedings were more effective than mothers in the pre-medicated group.

The nurse is the health professional most intimately involved with the mother-infant dyad during labour, delivery and the post-partum period. It is important to examine any factors which may affect infant feeding behaviours and mother-infant interaction because they are relevant to the planning, implementation and evaluation of nursing care. One important nursing function is the detailed observation,

evaluation and recording of patient state following medical and nursing interventions. It is important to know whether the baby is affected by the analgesics and tranquilizers used to relieve maternal pain and distress in labour, to what degree the baby is affected and whether one analgesic is less depressing to the infant's central nervous system than another.

While it is recognized that in the majority of cases maternal pain medication for labour will be necessary, an understanding of the effects of maternal medication on infant breastfeeding competence may influence the type, dosage and timing of administration of the medication given, with subsequent benefits to the suckling infant.

It is hoped that studies such as this one which explores the relationship of present day labour drug regimes on infant breastfeeding and the use of an instrument which assesses infant breastfeeding competence will provide valuable information to nurses and other health professionals who are engaged in promoting breastfeeding and helping breastfeeding mothers. For example, in the pre-natal period when the mother is preparing herself physically and psychologically to breastfeed, anticipatory guidance on the part of the nurse can prepare the mother for some of the difficulties of the early breastfeeding period, so that she may develop realistic expectations about her infant's state and feeding behaviours post-partum. A number of surveys of

mothers' perceptions of breastfeeding difficulty, showed that mothers mentioned the first week or two after the birth as the most difficult time during lactation with much of the stress related to lack of knowledge and encouragement (Ladas, 1972; Lawson, 1976). In the post-partum period by helping the mother understand that any infant sleepiness and reluctance to breastfeed is temporary, reassuring her of her ability to breastfeed and encouraging rooming-in so that the baby can be fed on a flexible schedule may assist the mother to overcome any negative experiences of the early post-partum period.

Although this study focuses on the infant and specific factors which may affect the infant's ability to breastfeed, it is recognized that this is only one part of the complex inter-relationship between the mother and the infant. A number of other variables also play important parts in establishing a mutually satisfying and effective breastfeeding relationship. Maternal motivation, social support, pre-natal preparation and professional nursing management are just a few of the factors which have to be considered in explanations of successful or unsuccessful breastfeeding. However to understand the total dyadic relationship and how problems in one member can affect the dyad it is important to investigate specific phenomena, especially if some of the problems are preventable to some

degree or can be mediated through appropriate medical or nursing interventions.

Conceptual Framework

The framework for this study is based on the effects of selected labour narcotic analgesics on infant behaviour, specifically infant breastfeeding ability. It has been well recognized that intra-uterine influences throughout pregnancy, labour and delivery have both direct and indirect influences on the fetus and the newborn infant. Such influences include medications which cross the placenta and become metabolized by the fetus (Shnider & Moya, 1964). The developing fetus and newborn infant are thought to be more susceptible to the action of drugs than the adult (Yaffe, 1973). The narcotic analgesics given to the mother in labour to relieve pain have as a side effect, central nervous system depression. This may affect the infant as well as the mother by reducing the infants' responses to stimuli and causing changes in the infant on neurobehavioural examination and in state of alertness (Hodgkinson & Marx, 1981). Although recent advances in drug analysis have given greater insight into maternal-fetal pharmacokinetics, little is known about specific drug transfer, routes of metabolism, and effects of these drugs and drug metabolites on the infant (American Academy of Pediatrics, 1978). In the absence of this type of information, other parameters in the

newborn have been used. Lower scores on the neurobehavioural examination and reduced states of alertness suggest that there will be similar effects on other aspects of infant behaviour such as infant breastfeeding behaviour.

Four assumptions have been made in the study:

1. That narcotic analgesia given to the mother in labour will affect the neurobehaviours of newborn infants, including their suckling behaviours, rooting and sucking.
2. That the effects on, and subsequent changes in, infant behaviours can be observed, tested and measured.
3. That evaluation of the neonate's breastfeeding behaviours is an important first step in understanding the complex inter-relationship between the mother-infant breastfeeding pair in the early initiation period of breastfeeding.
4. That difficulties with the infant's breastfeeding ability at this time have possible longterm implications for breastfeeding success and for mother-infant interaction.

Purposes of the Study

1. To describe the normal pattern of breastfeeding activity in healthy unmedicated neonates.

2. To test the hypothesis that healthy full term infants of mothers who received the analgesic medications meperidine (Demerol, Pethidine) or alphaprodine (Nisentil) will take longer to establish effective suckling behaviours in the early post-partum period than those whose mothers received no analgesia.

Specific Research Questions

1. What is the pattern of breastfeeding in a group of unmedicated babies?
2. Is effective breastfeeding delayed in babies whose mother received maternal labour analgesia compared with those babies whose mothers received no analgesia? If so, for how long is effective breastfeeding delayed following birth if the mother receives labour analgesia?
3. Is there a difference between the feeding behaviours of babies of primiparous mothers compared with babies of multiparous mothers?

Hypothesis

Healthy fullterm infants whose mothers have received the analgesic medications meperidine or alphaprodine in labour will take longer to establish effective breastfeeding

behaviours in the early post-partum period that those whose mothers received no analgesic medication in labour.

Definition of Terms

SUCKING - a neurological reflex present in all healthy newborn babies.

SUCKLING - synonymous with breastfeeding behaviours- i.e. the rooting, fixing and sucking activity of the baby at the breast.

EFFECTIVE BREASTFEEDING

- scores of 10 to 12 on the Infant Breastfeeding Assessment Tool (IBFAT).

ESTABLISHED BREASTFEEDING

- infant scores on the IBFAT within the 10 to 12 range for 3 consecutive feeds.

EARLY INITIATION PERIOD OF BREASTFEEDING

- the period immediately following birth to the end of the 4th day post-partum (96 hours).

CHAPTER II

LITERATURE REVIEW

The purpose of the literature review is to examine and analyze the literature relating to the specific problem in the early neonatal period which is the focus of this study, the relationship between maternal labour analgesia and infant suckling in the first four days after birth. Because there are very few research studies which address the effect of labour medication on the infant's ability to breastfeed, other studies which relate to the effects of analgesia on other aspects of infant neurobehaviour and which have implications for infant feeding behaviours will be included. For the purposes of the review, the term suckling will be used to refer to the specific rooting and sucking activity of the breastfeeding baby. The term sucking will refer to the neurological reflex and the sucking activity of the bottlefeeding baby. A review will also be done of the literature relating to the early initiation period of breastfeeding and the implications of difficulties during this period for breastfeeding success.

Maternal Labour Analgesia: Alphaprodine and Meperidine

Alphaprodine (Nisentil) is a rapid acting narcotic analgesic with a short duration of action. Except for its more rapid onset and shorter duration of analgesic action its pharmacological properties are similar to those of

morphine or meperidine. Also, alphaprodine is more potent than meperidine; it acts principally on the central nervous system (CNS) and on organs composed of smooth muscle. There is evidence alphaprodine enters the fetal circulation (Canadian Pharmaceutical Association (C.P.S.), 1986). The duration of action following subcutaneous administration lasts from one hour to over two hours, depending on the dosage administered as compared with the duration of action of meperidine, which is 2-4 hours. Analgesic effects usually occur within 2-30 minutes after subcutaneous administration (C.P.S., 1986, p. 501).

Meperidine hydrochloride is a synthetic substitute for morphine and is used to produce analgesia. It depresses the central nervous system probably at both the cortical and subcortical levels. Consideration of meperidine is incomplete without a review of its metabolite normeperidine, which is produced within 10 minutes of an intramuscular injection. Normeperidine has a greater respiratory depressant effect than meperidine in animals and a longer half-life (Hodgkinson & Marx, 1981). Meperidine is the most popular analgesic used in obstetrics today and most of the studies which have investigated the effects of drugs on infant neurobehaviour have included meperidine. Because blood levels are not representative of drug concentrations in the neonate's central nervous system, no absolute correlation has been found between the fetal blood level of

meperidine and neonatal condition. However, when 75-100 mg of meperidine were administered to mothers between one and three hours prior to delivery, the infants of these mothers had the highest incidence of CNS depression (Hodgkinson & Marx, 1981, p. 461). Other drugs, particularly ataractics such as promethazine may be given with meperidine for obstetric medication and increase its sedative effect.

Maternal Labour Analgesia and Infant Breastfeeding Behaviour

Over 25 years ago Brazelton began his studies of intra-uterine influences on neonatal behaviour and observed that tranquilizers and analgesics given to the mother during labour and delivery affected the neonate's initial weight gain, his response to breastfeeding, and his early learning tasks (Brazelton, 1961). In this retrospective study, the only one found in the literature to address the effect of labour medication on infant breastfeeding, data was collected on 41 babies of mothers who were multiparous and who had breastfed previously. The mothers were asked to register their impressions of the alertness and readiness of their babies to nurse in order to establish effectiveness of the baby at breastfeeding. Two items were recorded: 1. initial alertness on the part of the babies; and, 2. the difficulty involved in awakening them to feed. The results of the study showed a clear difference between babies whose mothers received little premedication and those whose

mothers were in the more heavily medicated group. On the third day after birth, feedings were 75% effective in the former group compared with 35% in the latter. The conclusions were that high doses of barbiturates with general anesthesia seemed to impair the infant's ability to establish a normal breastfeeding pattern. A delay in infant weight gain in the heavily medicated group was also noted. However, hospital routines, nursing practices and methods of obstetric medication have changed over the last 25 years. The routine in the Boston hospital, in the late 1950's when the study was done, of bringing the baby to the mother once at the end of 24 hours, twice on the second day and three times on the third day would not be recommended for healthy babies in the 1980's. Also the high levels of barbiturates and scopolamine, the so-called "twilight sleep" for management of normal labour is a thing of the past. The study did not attempt to take into account important variables such as duration and type of labour. Additionally all the mothers, including those in the non-premedicated group, received epidural anesthesia. The effects of anesthesia and medication on the mother's ability to handle the baby were not considered. Since the results were based upon the subjective evaluations of the mothers, this may have biased the results in favor of the least medicated group.

Maternal Labour Analgesia and Infant Sucking

A search of the literature has found few empirical research studies relating to the effect of maternal labour analgesia on the suckling or sucking behaviour in the newborn infant. Kron, Stein and Goddard (1966) in a frequently cited study of the effects of maternal labour analgesia, measured infant sucking behaviour with a suckometer, a device placed in the infants mouths, during the first four days after birth. In an experiment, the babies of a group of mothers who were administered 200 mg of secobarbital intravenously during labour were compared with infants from a group of mothers who received no analgesia or anesthesia. In the experimental group, those receiving the medication, sucking was depressed for up to four days following birth and these infants had lower average sucking rates, sucking pressures and milk consumption than their paired control counterparts. The findings of this study suggest that nutritive sucking is adversely affected by central nervous system depressant drugs administered to the mother in labour. These findings have potentially more serious implications for a breastfeeding baby who must be able to grasp the nipple for effective suckling to take place.

Maternal Labour Analgesia and Infant Drug Levels

A study of blood and saliva meperidine levels in the newborn infant found that in bottlefeeding infants whose mothers had received meperidine in labour, there was a significant decline in saliva meperidine levels during the first 48 hours after birth and an elimination half-life of about 30 hours. By contrast, in breastfed infants there was a 100% increase in saliva meperidine levels at 24 hours followed by a 39% decrease between 24-48 hours. This difference between the bottle and the breastfed infant was considered due to the breastfed infants receiving meperidine in milk (Freeborn, Calvert, Black, McFarlane & D'Souza, 1980). This study did not investigate the effects, if any, on the feeding behaviour of the infants. Little information is presently available about the rate of passage of drugs into human milk and the corresponding peak levels in milk in relation to the time of administration of the drug. However it does seem likely that the effects of analgesics such as alphaprodine and meperidine have potentially more deleterious effects on the breastfeeding baby compared with the bottlefeeding baby.

Another study of meperidine and bupivacaine (a local anesthetic widely used for epidural anesthesia) levels in maternal and umbilical blood concluded that:

Both pethidine (meperidine) and bupivacaine readily and extensively cross the placenta:

the amount of residue of the drug remaining in the neonate at birth depending largely on maternal dose, the time interval between maternal drug administration and delivery, and the physico-chemical properties of the drug. (Notariani, 1981, p. 1256)

In this study, peak levels of pethidine were measured in the umbilical artery blood when the drug was given at greater than 170 minutes before delivery.

Maternal Labour Analgesia and Infant Neurobehaviour

A pioneer in the study of early infant behaviour, Brazelton compared the state and behaviours of infants of mothers who had been given effective doses of sedative drugs with those whose mothers received little or no medication for labour and delivery. All babies seemed quite alert at birth, but following this period he found there was a period of relative disorganization which seemed to last 24-48 hours in the babies whose mothers received little or no medication and for three to four days in babies of heavily medicated mothers. "Disorganizing effects seem to occur as a normal result of birth and recovery processes, but they are accentuated and prolonged by medication ... and seem positively correlated with the type, amount and timing of the medication given to the mother" (Brazelton, 1961, p. 514). In this study infant state was assessed by observation

of state, respiratory activity, startle and refractoriness to external stimuli.

Visual attentiveness was found to be reduced in infants whose mothers had received obstetric analgesia (Stechler, 1964). In this study there was no control group of unmedicated infants; the mothers of all babies in the study had received analgesia in labour in different doses and at varying lengths of time from delivery. Because of the installation of silver nitrate drops which impairs testing of vision, the babies were 2-4 days old before being tested, by which time the full effects of the drugs may have been mediated. However the results showed that the more analgesic drugs administered to the mother closer to delivery the less attentive the baby is likely to be. Infants whose mothers had received medication within 90 minutes of delivery were less visually attentive than those whose mothers had received medication beyond this time period. The results suggest that timing of administration of the analgesia before delivery is an important factor.

Later studies using standardized neonatal assessment tests such as the Neonatal Behavioural Assessment Scale (NNBAS) developed by Brazelton (1973) have confirmed that low doses of obstetrical medication given to the mother in labour have subtle but significant effects on the behaviour of healthy neonates during the first days of life. A study of 25 normal term neonates delivered vaginally under

epidural anaesthesia, some of whose mothers had also received variable amounts of meperidine, found that the habituation rate to an auditory stimulus was twice as fast in those infants whose mothers received no meperidine compared with the meperidine group. In addition there was a significant correlation between the orienting score and the dose and timing of the meperidine. The babies in the meperidine group did less well on a number of other parameters of the NNBAS. The measure most sensitive to meperidine was inhibitory ability as gauged by rate of habituation to a redundant stimulus. The measure next most sensitive to medication was the infant's ability to respond (Brackbill, Kane, Manniello & Abramson, 1974, p. 120). In this study all mothers, including the no meperidine group, received epidural anaesthesia.

In the study with the largest number of subjects which investigated the effects of analgesia and anaesthesia on infant neurobehaviour, Hodgkinson, Bhatt and Wang (1978) tested 920 newborns, delivered by one of four different anaesthetic techniques. The infants were tested on the first and second day after birth by the Early Neonatal Neurobehavioural Scale (ENNS). All babies were healthy, fullterm and had normal Apgar scores. Approximately one-third of the mothers in each of the four anaesthesia groups received meperidine. The investigators statistically analyzed the results and concluded that meperidine caused a

generalized depression on the neurobehavioural examination during the first and second days of life. The results also showed that the higher the dose of the meperidine the lower the scores on the ENNS. They further concluded that meperidine was additive in its effect in combination with the general anaesthesia. The study report did not discuss the method of group assignment or randomization.

Generally, most studies using either the Scanlon Early Neonatal Neurobehavioural Scale (ENNS) or the Neonatal Behavioural Assessment Scale (NNBAS), the most commonly used assessment tools, have supported the theory that maternal labour analgesia causes subtle changes in newborn state particularly decreased alertness, decreased social responsiveness and self-quieting (Hodgkinson & Husain, 1980; Kuhnert, Linn & Kuhnert, 1985; Leiberman et al., 1979). These particular changes are the changes most likely to affect the infant's ability to feed and to interfere with the establishing of a satisfying breastfeeding relationship between mother and infant.

Infant State and Early Initiation of Lactation

Infant state is one of the most important variables in any study of the newborn (Emde, Swedberg & Suzuki, 1975). It is influenced by many factors such as maternal and/or infant health, type of labour and delivery, genetic factors and the effects of medications given to the mother in labour which

have crossed the placenta and entered the infant's circulation. Frequently more than one of these factors co-exist which may act synergistically to alter the behaviour of baby and mother (Avard & Nimrod, 1985). Reactions to stimuli such as the stimulus to breastfeed can only be evaluated within the context of the state of alertness. Wakefulness is the behavioural state in the newborn during which most information processing takes place (Wolff, 1959) and is considered to be of importance for the way the young infants experience their extra-uterine world (Emde et al., 1975). This study by Emde, Swedberg & Suzuki compared wakefulness states in two groups of babies, one group whose mothers had received sedative medications in labour, the other group no medications. Differences in behavioural states of wakefulness were found between the medicated and non-medicated babies. In the medicated group there was more quiet sleep, less wakefulness and longer basic rest-activity cycles after birth. The authors suggest that a wakefulness rhythm may have potential for "entrainment by biologically relevant cues such as would be contained in caretaking practices around feeding" (p. 782).

Rooting and sucking were both found to be greatly influenced by the degree of wakefulness and the age of the baby (Gentry & Aldrich, 1948). The most effective rooting and sucking behaviour was found in the alert, awake baby, while the difficult to rouse baby displayed no rooting and

poor sucking. This early study found an increase in rooting and sucking competency over the first six days post-birth. By the fourth post-partum day over 90% were rooting and sucking effectively. For the baby, rooting and sucking are two of the practice behaviours which are at first reflexly organized and become stabilized through repetition (Piaget, 1960). The newborn can discriminate between, and quickly become accustomed to, different tastes and concentrations of sweet solutions and quickly develops preferences for milk (Desor, Maller & Turner, 1973).

From the knowledge about the behaviour of newborns, Wilson (1980) provides the following summary:

1. Babies have different states of consciousness which affect both their response to stimulation and the kind of stimulation they perceive.
2. Babies have behavioural capabilities which both elicit caretaker interaction and positively reinforce interaction.
3. Babies are selective in both the kind and amount of stimulation they will process.
4. Each baby is different and is born with a unique pattern of behaviour which contributes to the nature of his or her interaction with the caretaker (Wilson, 1980, p. 410).

It appears that early exposure of the baby to the breast and breast milk will provide positive reinforcement to both mother and baby to continue breastfeeding and helps to establish synchrony in both the breastfeeding process and the mother-infant relationship. However, the quality of this early exposure is clearly influenced by infant state, particularly the state of responsiveness and ability to suck. In the absence of other health related causes, infant sleepiness and poor suckling are usually related to the analgesia or anesthesia given to the mother in labour.

The Early Initiation Period of Breastfeeding

The impact of negative or positive experiences with breastfeeding in the initiation period has been conceptualized by Bentovim (1976) who uses an application of general systems theory to social psychology and to the family as an adaptive system to create a framework for breastfeeding success or failure. "Breastfeeding is a systematic product of many interacting factors rather than a product of individual behaviour only. There are processes of 'positive feedback' which encourage breastfeeding and 'negative feedback' which dampens the process and leads to the choice of alternative methods of feeding (Bentovim, 1976, p. 160)."

Bentovim lists several factors which influence the decision to breastfeed or to continue breastfeeding: the

quality of contact with the newborn infant; the length of labour; the use of analgesia and anesthesia; and the infant's state and his response to attempted suckling. These were the major factors identified in the perinatal period and are usually interrelated. The physiological factors such as length of labour and the effects of maternal analgesia on infant state and suckling response have implications for the quality of contact between mother and infant. This contact provides either positive or negative feedback to the mother. Problems with an unresponsive infant who is reluctant to feed, since feeding is an integral component of caretaking for the mother, may affect maternal perception of the infant and adversely affect maternal-infant interaction. Bentovim (1976) sees the pleasure arising from successful breastfeeding as the template not only for good mother-infant relationships but for all relationships (p. 159). Even if one does not completely subscribe to Bentovim's observation that "in fantasy, infants do appear to eat their mothers and mothers feel miserable if not eaten by their infants" (p. 160), nevertheless a baby who refuses to feed, whether breastfed or bottlefed, is very discouraging to the mother and may create feelings of rejection and inadequacy in her perception of her mothering role.

Brazelton (1961), in his study of the effects of labour medication on infant breastfeeding noted the discouraging effect of a sleepy, unresponsive infant in the first few

days of life on the mother's perception of her own and her baby's feeding competence. The results of other studies have found that unsuccessful attempts to breastfeed and the subsequent maternal discouragement affected the quality of contact between mother and infant. Maternal discouragement due to problems in the post-partum period is one of the major reasons for the mother giving up breastfeeding during the early initiation period (de Chateau & Winberg, 1978; Jeffs, 1977).

Early Initiation of Breastfeeding and Breastfeeding Success

A number of studies have examined the positive effects of putting the baby to the breast as soon as possible after birth. de Chateau and Winberg (1978) compared primiparous mother-infant pairs randomly allocated to a study group and given approximately 15 minutes suckling time immediately post-birth with a control group which had routine care. The mothers in the study group breastfed longer, considered night feeds less of a problem, and produced more positive maternal behaviours than the mothers in the control group. In a similar study Johnson (1976) observed 12 mother-infant pairs and found a strong correlation between early breastfeeding and breastfeeding success. However the small number in this study limits the general applicability of the data.

Early initiation of breastfeeding also has physiological benefits for the infant which can contribute to breastfeeding success. DeCarvalho, Klaus and Merkatz (1982) showed that frequent unlimited feedings in early lactation are associated with lower serum bilirubin levels in the infant and more successful lactation. A separate study by DeCarvalho, Robertson, Friedman and Klaus (1983) demonstrated that early frequent and unrestricted breastfeeding increases early milk production and infant weight gain, one of the measures of successful lactation.

Conversely, Fisher (1984) considers that delay in initiating breastfeeding has contributed to iatrogenic problems such as breast engorgement and a more significant increase in infant weight loss in the first four days of life. Significant weight loss can have serious effects on the infant and on the mother's perception of the infant's progress on the breast. Lawrence (1981) suggests that a weight loss of more than 5% of birthweight in the first few days after birth is a risk factor for critical weight loss in breastfed infants in the first months of life and indicates a need for further evaluation and follow-up of the infant. Therefore any condition in the newborn which delays effective feeding has potentially deleterious effects on the infant and on the mother.

Summary

Some of the studies reviewed related to the effects of maternal labour analgesia on the neurobehaviour of the neonate, the effects on infant sucking and suckling, and on the neonatal blood and saliva levels in both breast and bottle fed infants in the early post-partum period. Generally, most studies used the Neonatal Behavioural Assessment Scale or the Early Neonatal Neurobehavioural Scale to support the theory that maternal labour analgesia causes changes in newborn neurobehavioural responses, particularly habituation to a redundant stimulus. The infants responsiveness and state of alertness were also affected. In turn, these affect the infant's abilities at feeding with potentially deleterious effects on both the mothers and their infants. Dosage and timing of administration of the drug were found to be important variables in the effects of such drugs on the neonate.

Other studies in the review have focused on the importance of the early initiation period of breastfeeding and the significance of difficulties during this period for breastfeeding success. It is suggested that delay in establishing an effective breastfeeding relationship has potentially negative effects on mother-infant interaction and on the mothers perception of and self-confidence in her mothering role.

CHAPTER 3

METHODS

Because of ethical, methodological and practical restrictions on manipulating the independent variable, maternal labour analgesia, this study was a prospective ex post facto study. The relationship between two commonly used labour analgesics and scores on the Infant Breastfeeding Assessment Tool (IBFAT) in infants from birth to four days post-birth was explored. Careful selection of research subjects was done on the basis of predetermined criteria. To strengthen the results and to reduce the potential for bias the researcher was blind to the analgesic group of the mother of each baby until data collection was completed.

The Population

The sample was drawn from a population of newborn infants, healthy at birth, whose mothers intended to breastfeed. To be eligible for the study, babies had to meet the following criteria. They had to be:

1. Healthy full-term newborn infants (38-42 weeks gestation).
2. Appropriate weight for gestational age.
3. Delivered spontaneously following uncomplicated pregnancies and labours. (Infants born to mothers whose labours were induced or stimulated were

included if there were no other complications.)

4. Assessed at birth to have normal Apgar scores (that is, ≥ 7 at one minute, ≥ 8 at five minutes).

Sampling

Sampling was non-random. On admission to the nursery following birth, the nursery staff identified and recorded the names of all babies who fit the criteria for admission to the study.

Out of approximately 250 babies delivered at this hospital during the period of data collection, 116 (46%) started to breastfeed. Of these 116, 69 (59%) were eligible for admission to the study. Selection of the babies was made easier by the policy in the maternity unit at the time of the study of transferring all healthy babies of normal deliveries directly from the caseroom to the well-baby nursery. Babies with problems or who had complicated deliveries were transferred to the Neonatal Intensive Care Unit. Almost all babies who were eligible were admitted to the study. The final sample was 86.9% of the eligible population (60 out of 69 babies).

Nine eligible babies were not included in the study for the following reasons: one mother had suffered a post-partum haemorrhage and could not feed her baby for several days and

six babies were missed because the investigator was unable to be present in the hospital for one two-day period. Two other babies were initially admitted to the study, but were not included in the data analysis. Both these babies were fed through a nipple shield throughout their hospital stay. This latter group was excluded because it was felt that this should not be assessed as effective breastfeeding for the purpose of the study. No mother refused to have her baby included.

The Setting

The setting for data collection was the mother's room in the post-partum unit of the tertiary-care maternity department in a general hospital. The policy of the well-baby nursery was that all babies room-in with their mothers as much as possible during the day. All babies in the study spent the greater part of the day in their mothers' rooms. Although most babies spent the night in the nursery, 24 hour rooming-in was available at the mother's request.

In the nursery there was a written policy that no formula supplement should be given to breastfeeding infants without a physician's order or unless the mother requested it. No baby in the study was ordered formula supplements. Four mothers requested and received formula for the baby even though the baby had nursed well. However the

breastmilk had not come in and the mother felt that the baby was hungry. There were no restrictions on the use of glucose water which could be offered to the baby after a feeding if the mother or nurse felt it was necessary.

Ethical Considerations

Any research study must include careful precautions to protect the rights of the subjects. The subjects of this study, newborn babies, were minors and therefore the mothers were asked to give consent on their behalf. Full explanations were given to the mothers (Appendix A) and they were assured that they could withdraw the baby from the study at any time without any negative consequences to their or their babies care. In addition, only mothers who could read or write English, who understood their role and participation in the study and who had signed the consent form were included. Although the mothers themselves were not the subjects of the study, because they were participating in the study by observing and recording their infants feeding behaviours, ethical issues relating to the protection of their rights were equally important and had also to be considered. The role of the researcher was one of observer and no treatment intervention was introduced, but it was recognized that the mothers might be made anxious because they had to closely observe their infants behaviour and feeding. However it is current nursing practice to ask

the mothers about their infants feeding behaviours in the early neonatal period.

The proposal for the research study was presented to the Human Investigations Committees at both the School of Nursing and the institution at which data collection took place (Appendix B). The research proposal was approved by these committees. Letters were sent to the medical and nursing staffs informing them of the study (Appendices C & D).

Because it was not known until the end of labour whether the baby fit the selection criteria for inclusion in the study, consent to include the baby in the study could only be sought after delivery. In the first instance, the mothers of the babies were approached by an intermediary in the post-partum unit. The intermediary, a Registered Nurse, gave a letter of explanation (Appendix A) to the mother and obtained verbal consent for the mother to be interviewed by the researcher. Later, after a period of at least 12 hours rest for the mother, which was stipulated by the Human Investigations Committee of the School of Nursing, the investigator approached the mother to give further explanations and to seek signed consent.

All data collected which might have identified the mothers and babies were held in strict confidence and were destroyed when analysis was completed.

The Procedure

Data were collected over a nine week period, mid-April to July. To obtain data as soon as possible after the baby had started breastfeeding, the researcher approached women who were willing to participate in the study as soon as possible after the 12 hour rest period following delivery. Data were collected on the earliest feeds once consent had been signed. If the baby had breastfed prior to consent being signed, those feeds were assessed retroactively from the mother's and, if one was available, the nurse's report. A total of 45 feeds were assessed in this way. There was some delay if the end of the 12 hour rest period occurred during the night. In these cases, data collection was started in the morning.

Once a baby was entered into the study, breastfeeding activity was assessed at each feeding using the Infant Breastfeeding Assessment Tool (IBFAT) (Appendix E). This was done by the mother at every feeding. Completed IBFATs were collected from the mother daily and the individual infant feeding scores were plotted on a graph for each baby until the baby was feeding well (Appendix F).

In order to check the congruence of maternal scores, the investigator observed one or two feeds daily at random throughout the approximately 60 days of data collection, giving a total of 77 independent observations to compare with those of the mothers. To rule out the influence of

visitors, night time versus day time or other environmental factors which might have affected the scores, the observations were carried out at different times during each 24 hour period. The 24 hour day was divided into six 4 hour observation periods, each represented by a number on a die. The 4 hour periods were randomly selected weekly in advance by tossing the die. Within this period, the first and, if one was available, a second baby to feed from the beginning of the time period was observed and scored by the investigator as well as the mother.


To minimize possible anxiety in the mothers if they thought they were being observed, the investigator visited each mother twice daily to see how they were coping, so that when the investigator entered the room to observe the infant's feeding behaviours, assessment could be done unobtrusively without distracting the mother.

After the first 10 and 20 investigator-rated feeds a check was made for significant disagreement between the maternal and the investigator's scores. A significant difference was predetermined to be a score greater than one in either direction. At this time significant disagreement occurred in less than 10% of cases. Where there was disagreement, the mother's scores were those used for the analysis. The investigator's scores were recorded separately for comparison with the mother's to assess inter-rater reliability.

In addition to the IBFAT scores, daily weight and information on whether the baby received water or formula supplements was recorded. Any unusual signs in the baby such as physiological jaundice were noted.

Based upon the infant's scores on the IBFAT, the length of time in hours from birth to the establishment of effective feeding was determined for each baby. This was determined by the first of three consecutive feedings which scored in the IBFAT scoring range of 10 to 12 for each individual baby. Then, the mean hours to established breastfeeding for each group were analyzed for the mean group time to the onset of effective feeding. Differences in mean IBFAT scores for every 12 hours during the first 48 hours after delivery were also analyzed for each group, the scores being the measure of breastfeeding competence. When a feeding did not fall on the 12 hour recording schedule, the score for the nearest feeding was used. When two feedings were equidistant, one was chosen by the toss of a coin.

Before the day of discharge from hospital, the mother's and baby's charts were reviewed by the volunteer assistants (R.N.'s) to confirm the accuracy of the maternal labour profiles and the data relating to the infants conditions (Appendices G & H). This was to ensure that the selection criteria were met. To confirm that no narcotic or tranquilizing medication were given to the mothers in the



non-medicated group and to confirm the dosages of drugs given to the other mothers, the mothers' medication profiles were cross-checked with the narcotics register in the hospital pharmacy upon completion of data collection.

The Instrument: The Infant Breastfeeding Assessment Tool

A search of the literature and consultation with experts in the fields of nursing, pediatrics and child development found that no tested, validated instrument for measuring infant breastfeeding behaviour in the immediate post-birth period presently exists. Therefore the Infant Breastfeeding Assessment Tool (IBFAT) (Appendix C) which was used in this study has been developed by the investigator. Its design was based upon the investigator's observations of newborn infants in clinical practice, knowledge obtained from a review of the literature and consultation with experts in the field.

The IBFAT is a short questionnaire consisting of six items. Item one relates to the infants state of wakefulness just before the start of the feed. Item two to five relates to infant's feeding behaviour. Item six relates to the mother's satisfaction with the feed. Items two to five were designed to be scored; each item score ranged from zero (low) to three points (high). The scores of items two to five were added together so that the total IBFAT score could range from zero to 12 (Appendix I). Summated scores of 10 to

12 were considered to indicate a successful feeding, that is, the baby was vigorous and fed well. Scores in the 6 to 9 range indicated a moderately effective feeding while scores of zero to 5 were considered to indicate a poor feeding, the baby was inactive and fed poorly or did not feed.

Items one and six provided for overall description and were not scored. To avoid automatic checking of the items, sequences for some responses were placed in reverse order, the highest scoring response placed in the first position rather than the fourth.

The Pre-Test

The instrument was pre-tested with ten subjects in the maternity unit. The IBFAT was found to be easy to use and could be completed in less than a minute. The mothers did not find it difficult or anxiety-producing. Their comments at this time pointed to the need for more than three choices for items one to five. The instrument was then modified and it was again pre-tested with five breastfeeding mothers. During the second pre-test the mothers of the infants and the researcher independently checked each infant's breastfeeding response at two separate feedings for each infant (10 feedings) and the scores were compared to assess inter-rater reliability. For this small group inter-rater reliability was 100%.

Statistical Analysis

Each medication group was analyzed for the time of onset of established effective feeding and also for feeding effectiveness at 12, 24, 36 and 48 hours post-birth. This was to assess any differences in breastfeeding effectiveness between each group within the first 48 hours post-partum.

The hypothesis was tested with Oneway Analysis of Variance (ANOVA) using the computer program the Statistical Package for the Social Sciences (SPSS^x) and Dunnett's t-test to determine statistical differences between the groups. For example using ANOVA:

1. The length of time from birth (time zero) in hours until the babies were feeding well was analyzed for each group.
2. The IBPAT scores at 12 hour intervals from birth were compared and analyzed among the groups for 48 hours.

Analyses were also carried out on special subgroups of the sample to control for and determine the effect of parity on the results.

CHAPTER 4

RESULTS AND DISCUSSION

The findings will be presented in four sections. First, the characteristics of the population will be described. This will be followed by a description of the pattern of breastfeeding in infants of mothers who received no analgesic medication in labour. Next, the preliminary findings relating to the infants of mothers who received analgesia during labour and the statistical analysis comparing these findings with those of infants whose mothers received no analgesia in labour will be presented. The dependent variables are the length of time in hours to establishing effective breastfeeding and IBFAT scores at 12, 24, 36 and 48 hours post-birth. Finally, the results of the statistical analyses carried out on the various subgroups within the main comparison groups will be presented. Results which address the significance of the time of administration of the analgesia prior to delivery will be included. These will include an analysis of the infants' times to established feeding in relation to the time of drug administration prior to delivery and the results of IBFAT scores at 12 hours post-birth. The subgroups for the analysis are: a) babies of multiparous mothers only in the alphaprodine and non-medicated groups; b) babies of primiparous and multiparous mothers; c) babies of

primiparous mothers in the unmedicated and the alphaprodine groups.

Population Characteristics

In all, 60 babies who were admitted to the study fitted the selection criteria for inclusion. Of the babies, 31 were female and 29 were male. Their birthweights ranged from 2750 to 4570 grams with a mean of 3594 grams. No baby developed any significant health problems in the first 48 hours after birth, but two babies developed physiological jaundice requiring phototherapy on the third post-partum day. Both babies were feeding well by this time and continued to feed well in spite of the jaundice, therefore data collection on these babies was completed.

The babies' mothers ranged in age from 17 years to 40 years; 58 were married, two were single. Of the group 21 were primiparous, 39 were multiparous and 32 of the multiparous mothers had breastfed previously. All the mothers were caucasian, the majority born in Canada and 51 (85%) lived in the city or the metropolitan area. The mothers all had essentially normal labours, but some mothers required oxytocin infusion to either initiate or stimulate labour. However this was for non-medical reasons and the labours were otherwise uncomplicated. Five mothers in the non-analgesic group received oxytocin at some point in their labour. Of these, four were multiparous, one was

primiparous. In the alphaprodine group, nine primiparous mothers and five multiparous mothers received oxytocin. In the meperidine group, three primiparous mothers required oxytocin. No labour was considered excessively long because only one dose of analgesia was required for the relief of pain. All the mothers were out of bed and resuming self care activities by eight to twelve hours after delivery.

When data collection on all 60 babies was completed, the sample was divided into three groups on the basis of the analgesic medication given to the mother in labour. There was a comparison group of 21 babies whose mothers received no medication in labour, a group of 32 babies whose mothers received alphaprodine and a small group of seven babies whose mothers received meperidine. In the alphaprodine group 28 mothers received the standard dose of 60 milligrams and four received half the standard dose, 30 milligrams. No other drugs were given in combination with this drug. There were 12 primiparous mothers in this group and 20 multipara. The meperidine group was much less homogeneous in the drug dosage and combination of drugs given. Three mothers were given 100 milligrams of meperidine with 50 milligrams of phenergan, two mothers were given 100 milligrams of meperidine with 50 milligrams of gravol, one mother was given 50 milligrams of meperidine with 50 milligrams of phenergan and one mother received 75

milligrams of meperidine with 50 milligrams of gravol. Six mothers in the group were primipara, and one was multiparous.

TABLE 1

Division of Infant Population Based on Parity and Analgesic Medication Administered to the Mothers in Labour

Medication Group	N =	Primi- parous	Multi- parous
No medication	21	3	18
Alphaprodine 60 mgs	28	12	16
Alphaprodine 30 mgs	4	-	4
Meperidine 100 mgs with Phenergan 50 mgs	3	3	-
Meperidine 100 mgs with Gravol 50 mgs	2	1	1
Meperidine 75 mgs with Gravol 50 mgs	1	1	-
Meperidine 50 mgs with Phenergan 50 mgs	1	1	-
TOTALS	60	21	39

Breastfeeding Patterns in the Group of Babies of Mothers who were Not Medicated in Labour

Of the total sample of 60 babies, 21 (35%) were babies of unmedicated mothers. The group was composed of 18 (85.7%) babies of multiparous mothers and three babies of primipara. The mean time in hours from birth to establishment of effective breastfeeding (that is, IBFAT scores in the 10-12 range for three consecutive feeds) for this group was 12.5 hours with a standard deviation of ± 10.6 . A total of 14 (66%) were 12 hours or less in establishing breastfeeding and 85.7% had established effective suckling behaviours by 24 hours after birth. The three babies (14.3%) in the group who took longer to establish effective suckling included two babies of primiparous mothers and one whose mother was multiparous (para three). The two babies of the primiparous mothers were considered moderately effective feeders, their IBFAT scores did not fall below eight at any feeding. Both babies were alert and responsive. The mother of one of these babies had flat nipples and the mother and baby required help from the nursing staff to get the baby to fix and suckle effectively. Although the baby was alert and sometimes frantic to feed, his scores were in the moderate range, seven to nine on the IBFAT, until he was able to grasp the nipple easily. This baby took the longest time of the babies in the unmedicated group to establish breastfeeding, 36

hours, but it was clear it was not due to infant unresponsiveness. The second baby was also alert but was described by the nurses as "mucosy" and took some persuasion to suckle. Its' scores were in the moderate range until 32 hours after birth. The baby of the multiparous mother had two feedings scored at 12 on the IBFAT within 12 hours of birth, but this was followed by a less effective feeding which meant that the baby did not have the three consecutive feedings in this range which was the predetermined criteria for establishing feeding. This accounted for a delay for this baby in fitting the criteria although generally the baby fed well from birth.

From a review of the data collected, babies in the unmedicated group were more likely to have been put to the breast in the recovery room than their medicated-group counterparts and to have suckled well at this time. In all 11 (52.4%) were put to the breast in the recovery room and ten suckled well. The mother of the eleventh baby described her as "looking around but was not interested in feeding".

Breastfeeding Patterns in Babies of Medicated Mothers Compared with Babies of Non-medicated Mothers

A preliminary statistical analysis was done on the total group of 60 babies. The oneway analysis of variance and Dunnett's t-test showed that as a group, babies of mothers who were medicated with alphaprodine took longer to

establish effective suckling. The analysis of variance data is presented in Table 2. The babies in the medicated groups took significantly longer to establish effective feeding compared with the babies of unmedicated mothers, 23.7 hours for the babies in the alphaprodine group compared with 12.5 hours ($p = < .05$, Dunnett's t-test). Babies of mothers who received meperidine took on average 8.9 hours longer to establish effective breastfeeding compared with the non-medicated group, 21.4 hours ($p = < .05$). However because this was a small group ($n = 7$) it should not be concluded that meperidine is preferable to alphaprodine.

TABLE 2

Results of Oneway Analysis of Variance (SPSS) for Length of Time in Hours to Established Breastfeeding for Non-medicated, Alphaprodine and Meperidine Groups

Source	D.F.	Sum of Squares	Mean Squares	F Ratio
Between Groups	2	1631.56	815.78	2.75
Within Groups	57	16863.42	295.84	
Total	59	18494.98		

The differences between the alphaprodine, the meperidine and the non-medicated groups were also analyzed using the Dunnett's t-test and the difference was significant at the .05 level. These results are presented in Table 3.

TABLE 3

Means, Standard Deviations and t-distribution for Length of Time in Hours to Establish Breastfeeding for Babies of Mothers who Received No Medication, Alphaprodine or Meperidine in Labour

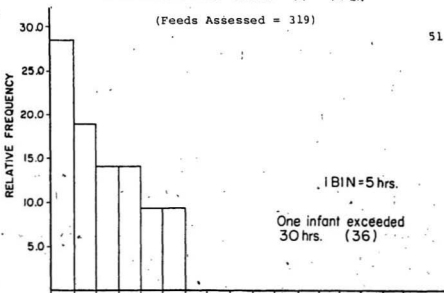
Medication Group	N	\bar{X}	S.D.	t	P (Dunnett's)
Non-medicated	21	12.5	10.6		
Alphaprodine	32	23.7	19.5	9.4	< .05
Meperidine	7	21.4	21.8	5.34	< .05

In order to illustrate in graphic form the distribution of the hours to established breastfeeding between the non-medicated and the alphaprodine groups, histograms were prepared to demonstrate whether there was an apparent difference between the groups. The frequency distributions for the length of time in hours to established feeding for the non-medicated and alphaprodine groups are presented in Figure 1.

NON-MEDICATED GROUP (1) (n=21)

(Feeds Assessed = 319)

51



ALPHAPRODINE GROUP (2) (n=32)

(Feeds Assessed = 450)

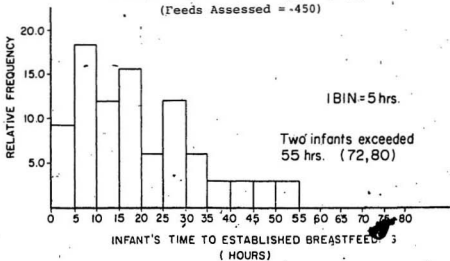


Figure 1 - Frequency Distributions for the Hours to Established Breastfeeding: The Non-Medicated and Alphaprodine Groups

From the histograms it is clear that the distribution for the group of babies whose mothers received alphaprodine in labour is shifted to the right as compared with the group of babies in the non-medicated group. It is also clear that there is a wide variation in the scores of the alphaprodine group, some babies having taken considerably longer than others to start effective feeding. Because of the small numbers and high variability in the meperidine group, a histogram was not done for this group.

Analysis of Group IBFAT Scores at 12, 24, 36 and 48 Hours Post-birth

The mean group scores on the IBFAT at 12, 24, 36 and 48 hours post-birth were analyzed (see Figure 2) to examine differences between the groups. The group mean IBFAT scores, which were based on the individual scores for each baby, were significantly different for the non-medicated group at 12 hours compared with the medicated groups. The mean scores (10.7) for the non-medicated group fell within the effective feeding range and were significantly higher than those of the other two groups ($p < .05$). The mean 12 hour scores for the medicated groups fell within the moderately effective range. By 24 hours post-birth, this difference was still evident, but it was not a statistically significant difference.

From the graph of the scores presented below, the mean scores for all three groups were in the effective feeding range by 30 to 36 hours post-birth.

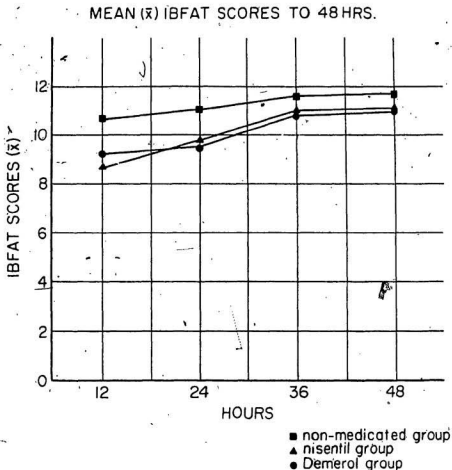


Figure 2 - Group Mean IBFAT Scores from Birth to 48 Hours at 12, 24, 36, and 48 Hours Post Birth (875 feeds)

Until effective feeding was established, babies' scores varied from feed to feed ~~and over~~-time. Before effective feeding was established, the babies of medicated mothers demonstrated two main patterns of behaviour; either they were too sleepy to suck or needed rousing throughout the feeding, or they were awake but did not root and sucked weakly. Almost all babies in the study, if they had not started feeding well from birth, showed a gradual or rapid improvement over the next two or three days. In the study only one mother, a primipara, gave up breastfeeding while in the hospital. Her baby took until the fourth day post-partum to establish effective suckling. When her breasts became engorged at that time she was too discouraged to continue.

Babies in the medicated groups were less likely to have been put to the breast in the recovery room within one hour of birth. Eight babies (25%) in the alphaprodine group and one baby in the meperidine group were put to the breast in the recovery room. Of these babies, seven suckled well and two were not interested.

Statistical Analyses of Subgroups

When the preliminary results from the oneway analysis of variance and Dunnett's t-tests on the total group were completed, it was decided to exclude the group of babies of the mothers who had received meperidine in labour from further analysis because of the small numbers in the group

and because of the different dosages and drug combinations administered to the mothers of the babies. Further analyses were done on the remaining 53 babies only.

a. Babies of Multiparous Mothers in the Alphaprodine and Non-medicated Groups

Because the alphaprodine group had a higher proportion of primiparous mothers and parity might have been responsible for the difference between the groups, the data was analyzed using only the data on the length of time in hours to establishing feeding for the group of babies of the 38 multiparous mothers in the unmedicated ($n = 18$) and the alphaprodine ($n = 20$) groups. The multiparous group was chosen to rule out parity as a confounding variable because it was a large group with almost equal numbers of babies of medicated and non-medicated mothers. Although parity per se may not be an important factor in assessing infant feeding response following analgesic medication, the timing and dosage of analgesic administration and other factors may be different for the multiparous mothers compared with primiparous mothers. There was a difference of six hours in the time to establishing effective feeding between the alphaprodine group and the non-medicated groups, the alphaprodine group taking that much longer to establish effective feeding ($\bar{X} = 16.95$ hours compared with 10.88 hours). However this was not statistically significant.

b. Effect of Timing of Administration of Analgesia Prior to Delivery

Having selected this multiparous group in order to control for parity it was recognized from the literature review that the timing of the administration of the drug prior to delivery is an important variable. In order to investigate the effect and significance of the timing of administration of the analgesia in labour in this study, the hours to established breastfeeding were plotted against the time of drug administration on a scatter diagram (see Figure 3). This diagram showed a curvilinear relationship between the time of administration of the drug prior to delivery and the time to establishing effective feeding. It suggested that the delay in effective feeding occurred in babies whose mothers received the analgesia between one and three hours prior to delivery. This observation has been supported by other studies (Hodgkinson & Marx, 1981; Notaricani, 1981).

Because analgesic administration one to four hours prior to delivery was identified in the literature as a critical factor affecting the infant's responses, the babies in the alphaprodine group were divided into two groups based on whether the analgesic medication was administered less than one hour prior to delivery or between one to three hours prior to delivery. All mothers received the medication within these two time periods.

ALPHAPRODINE GROUP-
BABIES OF MULTIPAROUS MOTHERS (n=20)

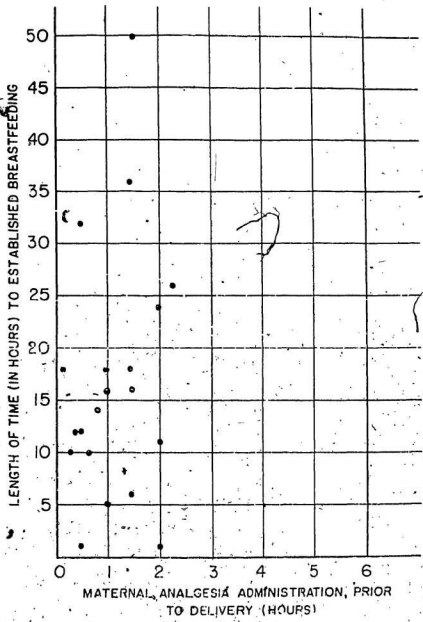


Figure 3 - Scatter Diagram of the Distribution of Hours to Established Breastfeeding by Time of Administration of Analgesia Prior to Delivery.

There were 11 babies in the former group and nine in the group whose mothers received the drug between one and three hours prior to delivery. These two groups, together with the babies of the non-medicated multiparous mothers ($n = 18$), were analyzed for the length of time to established breastfeeding using Dunnett's t-test (see Table 4). A statistically significant difference was demonstrated between the babies whose mothers received the alphaprodine between one and three hours prior to delivery and the babies in the non-medicated group ($\bar{X} = 21.2 \pm 17.1$ hours compared with 10.83 ± 8.46 hours). There was no significant difference between the non-medicated group and the group of babies whose mothers received the analgesic medication less than one hour prior to delivery ($\bar{X} = 10.88$ hours compared with 13.5 hours). Because this was a homogeneous group the results for this group were considered the most accurate and valid for testing the hypothesis, and indicate that the hypothesis was correct for babies of mothers who received analgesic medication between one and four hours prior to delivery. The hypothesis was not supported for the babies of mothers who received the medication less than one hour before delivery. Therefore timing of the administration of the analgesic medication in labour is a significant factor in explaining the results.

TABLE 4

Means, Standard Deviations and t-distribution for the Babies in the Non-medicated, the Less Than One Hour Group and the Babies of Mothers who Received the Analgesia Between One and Four Hours Prior to Delivery

Group	N	\bar{X}	S.D.	p
Non-medicated	18	10.88	8.46	
Drug administration less than one hour prior to delivery	11	13.45	8.37	n.s.
Drug administration between one and four hours prior to delivery	9	21.2	17.1	< .05

c. Comparisons of the Results for Babies of Primiparous and Multiparous Mothers

Because one of the research questions related to differences between babies of primiparous and multiparous mothers, a further analysis was done to assess differences between the babies of primiparous mothers and multiparous mothers in the study. To rule out the possibility that timing of administration of analgesic medication was the significant factor in the differences between the groups and because 83.4% of the primiparous mothers had received the analgesia between one and four hours prior to delivery compared with 45% of the multiparous mothers, only babies in

the alphaprodine group whose mothers had received the medication within this critical time period were included. Again the alphaprodine group was chosen because it was the largest group with better representation of subjects for testing the variable parity, while controlling the medication variables. There were nine and twelve babies, respectively of multiparous and primiparous mothers in the group for comparison purposes. A t-test was done to compare the results for the babies of primiparous mothers with those of multiparous mothers who received analgesic medication between one and four hours prior to delivery. There was a significant difference at the .05 level. The analysis shows that the babies of primiparous mothers took considerably longer on average to establish effective breastfeeding than those of multiparous mother; 35 hours \pm 24.1, compared with 21.2 hours \pm 17.1 ($p < .05$) even when both groups had received medication within the one to four hour time period prior to delivery. This suggests that parity is a significant variable in the results even after timing of analgesic administration is controlled.

TABLE 5

Means, Standard Deviations and t-distribution for Babies of Primiparous and Multiparous Mothers Who Received Alphaprodine One to Four Hours Prior to Delivery

Group	N	\bar{X}	S.D.	\checkmark
Babies of multiparous mothers	9	21.2	17.1	
Babies of primiparous mothers	12	35.0	24.1	< .05

d. Comparisons of the Results for Babies of Primiparous Mothers in the Alphaprodine and the Non-medicated Groups

The length of time to established feeding was compared for the babies of primiparous mothers in the unmedicated and the alphaprodine groups. The babies in the alphaprodine took 12.7 hours longer than the unmedicated babies (\bar{X} = 35 hours compared with 22.3 hours). However there were only three babies in the unmedicated group, so the results for this group were not subjected to statistical analysis.

Congruence of Maternal-Rated and Investigator-Rated IBFAT Scores

During the period of data collection, data was collected by the mothers on 920 individual infant feedings. Of these feedings, 77 (8.4%) were simultaneously assessed by

the investigator to check inter-rater reliability. Agreement between the mother and the investigator occurred in 70 out of 77 jointly assessed feedings, an agreement of 91%.

Infant Weight Loss

As well as the assessment of the infant's feeding behaviours by the use of the IBFAT, attempts were made to validate the data collected on the infant's feeding by frequent visiting of the investigator to the mother-infant pair, examining the nurses progress notes and checking physical parameters particularly percentage weight loss for each baby. Because weight loss in the early post-partum is considered an important indication of adequate feeding (Lawrence, 1980) an attempt was made to assess the percentage weight loss for all babies on the fourth day following birth. The fourth day was chosen because it was expected that the weight loss should have peaked and the baby started to gain weight by the fourth post-partum day. The mean percentage weight loss for the total group was 4.8%, but a number of subjects were lost by the third day due to discharge from the hospital. In these cases, which involved multiparous mothers, the infant's weight had not started to increase, unlike the majority of the weights of the other babies, and therefore inter-group comparisons could not be made.

Telephone Follow-up Survey

Mothers were telephoned one month after leaving the hospital to find out if they were still breastfeeding. Of the 59 mother-infant pairs who were breastfeeding on discharge from hospital, only 49 could be contacted. Of the women contacted, 39 (79.6%) were still breastfeeding completely, six (12.2%) were breastfeeding with a formula supplement and four (8.2%) had changed the baby to formula feeding. Since the investigator was unable to contact all subjects no further analysis of data was attempted at this time.

Summary of the Results

The analysis of the results of the study indicate that a standard dose of the maternal labour analgesic alphaprodine, when administered one to four hours prior to delivery, affects the infant's breastfeeding ability and can delay the establishing of effective breastfeeding. Babies of mothers who had not received analgesic medication during labour established breastfeeding earlier and had higher IBFAT scores than babies in the medicated groups. However there was no statistically significant difference between babies of mothers who received the analgesia within one hour prior to delivery and the babies of unmedicated mothers. This suggests that timing of the administration of the analgesia in labour is an important factor.

Delay in establishing effective feeding was found to be particularly significant for babies of primiparous mothers in which a delay of several days may occur. Babies of multiparous mothers were also affected but not to the same degree. Delay in establishing effective breastfeeding also occurred in the babies whose mothers had received meperidine, but the small numbers, the diversity of drug dosages and the use of the drug in combination with other drugs make the results for this groups inconclusive.

Discussion

The results will be discussed under two main headings, the effects of maternal labour analgesia on the infant's breastfeeding behaviours and the usefulness and suitability of the Infant Breastfeeding Assessment Tool. The IBFAT will be discussed in detail because the data on which the results of the study are based, the assessment and measurement of infant breastfeeding competence, were measured by the IBFAT and therefore the instrument is central to the study.

Maternal Labour Analgesia and Infant Breastfeeding

From an analysis of the feeding behaviours of healthy babies of mothers who received no analgesic medication in labour, useful baseline data were obtained on infant suckling in the initiation period of breastfeeding. The babies of unmedicated mothers, when given the opportunity,

started breastfeeding effectively very quickly after birth and maintained effective feeding behaviours throughout the post-partum period. This supports the observations of other studies that early initiation of breastfeeding promotes positive breastfeeding behaviours at this time (Johnson, 1976; Salariya, et al., 1978).

The first opportunity for the baby to suckle is in the period immediately following birth. A higher percentage (52.4%) of babies of unmedicated mothers were put to the breast in this period and all but one of them suckled well. This was compared with babies of medicated mothers, 31% of whom went to the breast in the recovery room. All but two of these babies suckled well. However, although all the babies in the total sample were healthy at birth with good Apgar scores whether the baby went to the breast in the immediate post-birth period or not depended on whether the mother was knowledgeable and took the initiative to suckle the baby or whether the individual nurse first suggested it. How early the baby received the feed post-birth was a variable which could not be controlled. Therefore the fact that as a group the babies of unmedicated mothers had an earlier start at the breast in this study cannot be said conclusively to be related to the infant's state of alertness. However, it does seem reasonable to assume that alert, responsive mothers and babies will tend to breastfeed earlier: While some babies were affected to some degree by

either anatomical problems with the mothers nipples or with the baby's mouth, the alert responsive baby was less affected by these problems than a baby who was sleepy and sucked poorly. In addition, the group of unmedicated babies provided a comparison group for the statistical analysis to assess the effects of analgesic medication on the newborn infant's breastfeeding behaviours.

Some babies of medicated mothers also started to suckle well soon after birth especially if medication was given within one hour prior to delivery and appeared much less affected by maternal analgesia than other babies in the group. Nevertheless, the results of the statistical analyses suggest that a standard dose of maternal labour analgesia, when administered between one and four hours prior to delivery, delays the establishing of effective infant suckling by several hours and, in some cases, days. The analysis showed a statistically significant difference between the medicated and the non-medicated groups of babies. These results appear to support those of other studies which have suggested that timing of administration of the analgesia between one to four hours prior to delivery causes decreased neurobehavioural responses in the newborn (Hodgkinson & Marx, 1981; Hodgkinson, Bhatt & Wang, 1978). It is clear, however, that babies of primiparous mothers as a group were affected more and scored lower on the IBFAT than those of multiparous mothers. There are a number of

possible explanations for the lower scores. One, as a group, 83.7% of the primiparous mothers in the alphaprodine group received labour analgesia within one to four hours prior to delivery compared with 45% of the multiparous mothers. This is the time period most likely to affect the infant. Two, maternal inexperience, especially with a baby who is initially less responsive to the feeding situation, may have further decreased the IBFAT scores in some infants at some feedings. Three, lack of nursing support, due to nursing workload, to mothers needing help may have contributed to a less than optimum performance of the infant at a feeding. It was rare, however, for lack of nursing support to occur at more than one feeding in the feeding sequence. If there had been difficulty at a feeding this was usually reported to the nursery staff and efforts would be made to give extra help to the mother and baby at the next feeding. A final consideration which may explain the difference between babies of primiparous and multiparous mothers is that mothers who have breastfeeding experience have resolved the anatomical problems such as flat or inverted nipples by breastfeeding a previous baby. Whereas anatomical problems in the mother who has not previously breastfed could contribute to lower IBFAT scores in the baby. Unfortunately, there were too few babies in the non-medicated primiparous group ($n = 3$) for valid statistical analysis to compare the results for this group with the babies of primiparous

mothers who received analgesic medication. However, when the results for babies of multiparous mothers who received analgesic medication between one to four hours prior to delivery were compared with those of the primiparous mothers, most of whom received medication within this same time period, the babies of primiparous mothers took considerably longer to establish effective feeding than the babies of multiparous mothers. Therefore parity, and factors associated with it, is identified as a significant variable.

When the study was designed, considerable thought was given to the issue of parity as a confounding variable and a decision was made to include babies of both primipara and multipara in the sample. The reason for this decision was partly based upon the assumption that since it was the baby's breastfeeding behaviours being studied, the parity of the mother should not in itself be a factor. It was felt that if indeed parity was identified as a significant variable this would emerge on the data analysis. In the meantime, the inclusion of all healthy babies would yield more information.

The data collection and statistical analysis were helped considerably by the standard practice of most doctors in the labour and delivery unit of giving one analgesic in one standard dose to mothers in normal labour. This was one variable which was more easy to control. However, studies of

the effects of maternal labour analgesia on the infant cannot avoid consideration of the timing of administration of the drug prior to delivery. Although the only way to accurately determine the rate of metabolism of drugs in the fetus in labour is by sampling of fetal drug levels, in utero and at birth (Kuhnert, Linn & Kuhnert, 1985), for ethical and practical reasons this was not feasible. Nevertheless, the results of this study supported those of other studies cited in the literature review which found a correlation between timing of analgesic administration to the mother in labour and decreased responses on neurobehavioural examination in the neonate (Leiberman et al., 1979; Hodgkinson & Husein, 1980).

The Infant Breastfeeding Assessment Tool

Because no previously tested research instrument was available for this study, the Infant Breastfeeding Assessment Tool (IBFAT) was developed to assess and measure infant breastfeeding competence. In designing the instrument the main purpose was to develop an instrument which was accurate, measured the infant's rooting and suckling behaviours and which could be used easily by mothers and nurses to assess the infant's performance at each feed:

The IBFAT is a six item assessment tool, four items of which are scored. These four items, numbers two, three, four and five, are specifically related to the rooting and

suckling behaviours of the infant. The scoring range was 0 to 12 for each feeding. On average the babies fed at three to four hourly intervals. Scores in the range of 10-12 for a particular feeding indicated effective vigorous feeding. In fact most babies who were effective vigorous feeders scored 11 or 12. Babies who scored 12 were babies who when put to the breast, spontaneously turned their mouths to the mother's nipple and readily started to suckle. These babies continued to suckle throughout the feeding. Within the 10-12 range some babies lost points by the mother having to guide the baby's mouth to the nipple (Item 2) or by taking pauses throughout the feeding (Item 5). The latter had more to do with the individual baby's feeding pattern rather than feeding difficulties and this behaviour was allowed for in the effective feeding range.

Babies who scored in the seven to nine range were considered moderately effective feeders. They were babies who suckled fairly well with varying degrees of encouragement. Some did not root, the mother would have to put the nipple in the baby's mouth to stimulate it to suckle. The suckling pattern was sporadic, the mother or nurse having to keep stimulating the infant to continue to suckle.

Babies who scored in the zero to six range were babies who either could not be roused for feeding (zero) or who did not root and suckled weakly for short periods only. An

effective suckling rhythm was not established for that particular feeding.

In clinical practice much assessment of infant breastfeeding behaviours is done by mothers reports, except in those instances where the mother is having difficulties and requires the nurse's help. The IBFAT is a potentially useful assessment tool which can be used by mothers and nurses. The mothers reported that it was easy to use and could be completed quickly.

Inter-rater reliability between the mothers and the investigator was very high particularly in the upper and lower scoring ranges. Babies who were feeding well or feeding poorly were easy to assess. However, the moderate feeders who scored in the middle range were harder to assess because more judgement was required. Despite this the rating between mother and researcher was rarely greater than one in either direction. Sometimes the mother would score one item higher or lower than the researcher while the researcher would score a different item higher or lower than the mother, but the overall score for the feeding would be the same and reflected the infant's performance at the feeding.

One item (Item 2), takes into consideration the amount of help needed by the baby either from the mother or the nurse, to start suckling. It is possible that at some feeds the baby's feeding was not accurately assessed when there were feeding difficulties because nursing help was not

available to help the less experienced mothers position the baby on the breast. This may have been due to heavy nursing workloads or because the mother did not request help. However it was impossible to control this factor. It is likely that this would have affected the babies of primiparous mothers more than those of multiparous. Therefore these babies may have scored lower than babies of multiparous mothers at a similar feeding. As already stated this may have been a factor in producing the 14 hour difference between the babies of primiparous mothers and multiparous mothers in the alphaprodine group. The baby of one of the seven multiparous mothers, who were breastfeeding for the first time, took 52 hours to achieve consistent scores in the 10 to 12 range on the IBFAT. The mother of this baby was the only one in this group to receive alphaprodine within one to four hours prior to delivery (1.5 hours). The scores for this baby are similar to those of the babies of primiparous mothers who were slower to establish an effective feeding pattern.

One of the two non-scoring items on the IBFAT (Item 1) relates to infant alertness or sleepiness when the baby is picked up to feed. This item was included to record infant state of alertness at the start of the feed. Although the policy of the maternity unit was to feed babies "on demand", if the baby slept beyond the four hours the mother might be asked to wake the baby to feed depending upon the baby's

condition and timing of previous feeding. Again nursing workload could have been a factor in whether advantage was taken of the infant's readiness to feed. The investigator was aware of some instances of babies in the nursery crying lustily and sucking on their fists who could not be taken to the mothers immediately. Thus a state of apparent readiness could not be used to advantage. However this seemed to affect babies in all groups.

The final, non-scoring, item on the IBFAT was a simple fixed-choice item which related to how the mother felt about the way the baby fed at each feeding. In order to keep the IBFAT as simple as possible for the convenience of mothers, a limited assessment only was done on maternal perception of the feeding. The choices ranged from "not pleased" to "very pleased". As might be expected the more effective the feeding the more pleased the mother. However there were exceptions. Being pleased is, of course, highly subjective. One mother whose baby was feeding well and who expressed herself "not pleased" explained "he is not on a schedule yet".

The observations of the study support the observations of other investigators that the effects of maternal labour analgesia on infant suckling can only be evaluated in the first 48-60 hours after birth (Kuhnert, Linn & Kuhnert, 1985). After this time other variables such as maternal breast engorgement, sore nipples, physiological jaundice, or

post-partum "blues" may affect either the baby's feeding ability or the mother's perception of the feeding. For example, the baby will score lower if he or she, although, alert and ready to feed, has difficulty fixing on the nipple due to breast engorgement. This was observed on the graph of IBPAT scores as a temporary drop in score on the day of engorgement, usually the third to fourth day post-partum, in babies who had previously been feeding well. This did not affect the results relating to the main hypothesis because in most cases the drop in scores occurred after the baby was considered to have established effective feeding. Lower scores occurring in an alert, vigorous baby should direct the nurses to a problem other than one relating to infant state and calls for further assessment of the mother-infant pair.

For the purpose of assessing infant breastfeeding the IBPAT appeared in this study to have an acceptable degree of accuracy in measuring infant suckling behaviours throughout the early post-partum period, but, of course, further testing of the instrument is required before its usefulness can be confirmed.

Maternal Responses to the Infant Breastfeeding Assessment Tool

Mothers reactions to the IBPAT varied. In the first 48 hours the mothers were usually careful about completing it.

Once the baby was feeding well consistently, some mothers lost interest in completing it and when asked would say "The feeds are all the same now. He/she is doing fine." Other mothers preferred to continue to complete it even after being told they could stop because "it helps me keep track of how she is doing" or because they were anxious to give the investigator as much data about their babies as possible. Mothers were invited to write any comments they wished on the IBFAT form either to explain something about the feeding which they felt could not be expressed on the tool or about how they felt. However most comments were made to the investigator directly during the twice daily visits.

The issues of maternal perception of and satisfaction with their babies feeding behaviours are extremely important for the overall success of both breast and bottlefeeding experiences. While these are beyond the scope of this present study, some effects of the babies' responses to the feeding situation on the mother's satisfaction both with herself and with her baby were evident during data collection.

The significance of the mother's perception of the baby's satisfaction with the feeding as positive reinforcement to the mother to continue, was expressed by one mother who commented that "he likes it so I guess I'll keep it up".

Inexperienced mothers often recognized their own inexperience and at the same time their babies' competence with breastfeeding. One primiparous mother, expressing the sentiments of some of the others, said "He knows exactly what to do. It's me that has to learn." A number of mothers made comments relating to their perception of the baby liking breastfeeding. "She likes it", "He loves it" and similar sentiments were expressed. Another mother said "I think if he had not been a good feeder I would have been too upset to fill in the form [the IBFAT]."

The mothers did not know that a major purpose of the study was to assess the effects of medication in labour. This was to avoid feelings of guilt if they felt that the baby was performing less well and that it was due to medication they took for pain. This might also have led to inflated assessments and IBFAT scores. However, even knowing that the baby was being observed for a research study could have affected the mothers responses on the IBFAT. For this reason as well as the frequent visiting of the investigator to the mother-infant pair, other assessment data from nurses notes, researcher's notes and physical parameters such as percentage weight loss, adequate hydration and elimination were checked on an ongoing basis for each baby.

While aware of the methodological difficulties inherent in this type of research, and the difficulty of drawing firm conclusions from the results, nevertheless there are babies

who, for whatever reason, are very slow to start feeding effectively. The mothers of the babies in the study who were slow to start feeding needed a great deal of encouragement and support. Indeed a number of mothers expressed their appreciation to the investigator for her frequent visits in the early post-partum period as they found it very helpful to have someone with whom to discuss their babies. This has implications for the appointment of experienced lactation nurses to give their time and expertise to breastfeeding mothers and babies in the early post-partum period.

As well as having a number of subtle effects on the mother, delay in establishing feeding had a number of deleterious effects on the baby. Although formula supplementation was discouraged, the baby would be encouraged to drink glucose water from the bottle and nipple shields would be presented to the mother to encourage the baby to suck. There is some evidence to suggest that both these practices may lead to "nipple confusion" and a reluctance on the part of the baby to suckle from the breast (Marmet & Shell, 1984). However, adequate hydration is physiologically important for the baby and the management of these slow-to-feed babies is a challenge to maternity nursing.

An interesting effect of the baby's suckling behaviours on the nursing staff was also observed. Such value terms as a "good" baby or "naughty" baby were occasionally used which

further reinforces the mother's confidence or anxiety at her own or her baby's performance.

In summary, within the limitations of the study it was clear that some babies took considerably longer than average to establish effective breastfeeding behaviours. From the results, this appears to be related to the administration to the infants' mothers in labour of a standard dose of a maternal labour analgesic medication. However the relationship is only statistically significant if the drug is given between one and four hours prior to delivery. Further, there is an idiosyncratic effect. Within the same subgroup babies vary widely. The dose and timing of an analgesic given to the mother of one baby may not affect that baby, while the same dose given within the same time period to another mother may affect the baby of that mother for several days.

Babies of primiparous mothers were affected more than babies of multiparous mothers, possibly because they were likely to receive the drug at the optimal time for affecting the infant's neurobehavioural state and state of alertness. Maternal inexperience with handling the newborn infant coupled with insufficient nursing help at some feedings may also be a factor.

During the study the problems encountered by mothers whose babies were initially slow to feed were evident. The effect of the baby's response to the feeding situation on

the mother's perception of her own and her baby's satisfaction with the feeding appears to be a crucial factor in breastfeeding success.

CHAPTER 5

LIMITATIONS AND CONCLUSIONS

In this chapter, the limitations of the study will be outlined. Conclusions will be drawn from the results and the implications of the results of the study for nursing education, practice and research will be discussed.

Limitations of the Study

A limitation of the study is that the instrument used to assess and measure the infants breastfeeding competency, the Infant Breastfeeding Assessment Tool, is a new instrument which has not been previously tested to establish reliability and validity. Although inter-rater reliability in this study between the mothers and the investigator was high, it needs to be re-tested by nurses and other health professionals involved with neonates and their mothers. The study was confined to one hospital maternity population and therefore it also needs to be tested in other centers before it can be confirmed as a useful assessment tool for the breastfeeding neonate.

An additional limitation relates to the subjectivity of the mothers evaluation of the feed. Because all the feeds in the study were assessed by the mother, her perception of her infant's feeding behaviour may have been influenced or affected by variables relating to her emotional or physical state. Anxiety or depression might cause the mother to

assess the baby negatively which could contribute to lower scores, or if there were other problems such as breast engorgement she might negatively score the total feeding experience rather than the baby's rooting and sucking behaviours. In this study this happened rarely, but it was felt to be a factor in an occasional feed for three mothers.

If the mother felt that her infant's performance was being evaluated she might score the baby higher than an independent observer. Although maternal perception of the infant's feeding ability is important and relevant to the total experience, from a research point of view it is based upon subjective evaluation which weakens the results to some degree.

A third limitation was imposed because the independent variable, the labor analgesia, could not be controlled or manipulated. As a result one of the medication groups, the meperidine group, was numerically under-represented in the sample. Therefore, generalizations based on the results for this group cannot be made and it could not be determined whether one medication was less depressing to the infant's breastfeeding behaviour than the other.

A further limitation was imposed by the Human Investigations Committee of the School of Nursing. Because the investigator could not contact the mothers until after a 12 hour period of rest after delivery, the earliest feeds from birth had to be assessed retroactively. Although the

number of feeds assessed retroactively was small, 45 out of 920, and only involved 1-2 feeds for any one baby. In some cases, if the baby was born in the evening, it could be 12 hours or more before the baby went to the breast for the first time the following morning. The study would have been strengthened if the investigator had been permitted to assess feeds earlier than the 12 hour period.

Although an attempt was made to control the variables within the sample population by establishing fairly rigid criteria for selection of the babies, one very important extraneous variable could not be controlled. That is, the actions or non-actions of the individual members of the nursing staff at any one time. For example, whether the baby went to the breast in the delivery room or not, how much help the mother who needed help actually received it and whether there was delay in bringing a baby, who was alert and ready to feed, from the nursery to the mother, depended at times on the individual nurse's responses to the situation or nursing workload. However, these latter instances occurred infrequently and would have affected mainly the babies of primiparous mothers who tend to need more help.

Conclusions

The major purposes of the study were to determine whether maternal labor analgesia delayed the initiation of

breastfeeding and to assess the usefulness of a newly developed instrument for assessing neonatal breastfeeding behaviour in the first four days post-birth.

From the results of the statistical analyses of the data collected from the 60 babies in the study, maternal labor analgesia, if given within 1 to 4 hours prior to delivery, correlates with a delay in the initiation of effective breastfeeding by several hours. However it is clear that there is an idiosyncratic effect. Some babies are little affected by a dose and timing of administration of a drug which, if given to the mother of another baby, can affect that baby for several days. These results were significant, but the major significance of the study lies in the data collected upon which a descriptive analysis could be done on individual infant feeding patterns and the implications for these patterns on the mother's perception of her infant and on her own breastfeeding competence. When scores were graphed for each baby, two typical patterns emerged. Either the baby breastfed well from birth or there was a slow start with a gradual improvement over the next few days.

On the pre-test, one baby had persistently low scores throughout the hospital stay. The baby was switched to the bottle on the day of discharge. A baby with this atypical pattern suggests a need for close follow-up by physician and community health nurse since weak sucking can indicate other

health problems such as neurological damage. The IBFAT, which has been discussed in more depth in chapters three and four, proved useful in this study for assessing infant behaviour in the early post-partum period. With regards to assessing the effects of labor variables, including maternal analgesia, other investigators have pointed out that this must be done as soon after birth as possible, before environmental and other variables confound the results (Kuhnert, Linn & Kuhnert, 1985). The importance of early assessment of the neonate was substantiated in this study. Observations of the healthy baby in the first 48 hours tended to be uncomplicated by other variables. After 60 hours, problems such as physiological jaundice and breast engorgement provide competing explanations for less effective infant feeding behaviours. The competing explanations may contribute to lower scores on the assessment tool and these can not be assumed to be related to labor factors such as medication effects.

Overall, the instrument was very useful in assessing infant responsiveness to the breastfeeding situation and data was obtained about individual rooting and sucking behaviours which can be subjected to further analysis. This analysis is outside the scope of the present study.

Implications of the Study

Although the study is narrowly defined in terms of investigation of the effects of analgesia on the infant, the ultimate significance and implications of the results relate to the total mother-infant breastfeeding relationship.

There are two aspects of the study which have importance for nursing practice, education and research. First, there are the deleterious effects of medication on infant responsiveness since the unresponsive baby may initially be too sleepy to feed. This applies not only to the breastfeeding infant, but is equally important for the mother of the sleepy, unresponsive bottlefeeding infant.

The second aspect of the study is the development of the IBFAT which has potential usefulness for research, education and practice. Although it may be seen as a potential weakness in the research design, involving the mother in the assessment of the infant has implications for the mother's learning about her infant's breastfeeding behaviours and responses. The use of the instrument encourages parent participation and responsibility in the post-partum period. Within the self-care model for nursing practice (Orem, 1980) it provides a more accurate assessment of infant feeding and feeding difficulties for both parents and nursing staff. However, as already stated it needs to be more widely used in other centres and for other populations

before its usefulness in assessing infant suckling behaviours is established.

Nursing Practice

Pain medication in labor is an important factor in the management of labor. Administration of analgesic medication to mothers is often necessary. Nevertheless a number of studies have shown that effective pre-natal preparation both for labor and delivery, and continuous support during labor reduces the amount of analgesic medication needed. Therefore in the pre-natal period effective pre-natal education by nurses who understand the labor and delivery processes can reduce maternal anxiety and pain in labor.

Preparing the mother for breastfeeding and anticipatory guidance during the pre-natal period will encourage the mother to have realistic expectations of her infant's behaviour post-birth. For example, if the mother is told that "on average babies take 36 hours to start feeding well and some take longer" she may appraise her infant's feeding behaviours more realistically in the early post-partum period and will be less discouraged if her infant does not establish effective feeding within the first 24 hours.

During labor, the constant support of the nurse and if possible, a significant other person as coach may help reduce the need for analgesia. By identifying on admission to the caseroom those mothers who intend to breastfeed, the

nurse and physician may more judiciously adjust the dose and timing of administration of the drug, bearing in mind the potential effect on the neonate. However because of the nature of individual labors, the drug will be frequently given at a time likely to affect the newborn. In this case, post-partum nursing support, both physical and emotional, is crucial to assist the mother whose baby is unresponsive and is having difficulty feeding. On paper, a 12 hour delay in breastfeeding is not a long time period, but it normally encompasses three feedings, at which the mother may have been struggling to entice the infant to suckle. The management of the slow-to-feed infant is a challenge to clinical nursing.

In a study of the early post-partum breastfeeding experiences of hospitalized mothers, the psychological factor was found to be very strong in the early post-partum period (Solberg, 1981). Preparation for labor and delivery, the initial contact and feeding of the infant and the hospital environment were important constructs. How well prepared she was for breastfeeding and how conducive the hospital environment was perceived to be in fostering conditions favorable to the initiation of breastfeeding, showed the best relationship to maternal satisfaction in the early initiation period (p. 94). Promoting an environment conducive to breastfeeding is a challenge to maternity nurses. Serendipitous observations of the actions or

non-actions of the nursing staff during this study supported the idea that the hospital environment and nursing responses to the mother-infant pair can facilitate or retard an effective breastfeeding relationship.

In nursing practice, interventions are based upon comprehensive assessment. The use of an assessment tool which can be completed by the mother or the nurse will give valuable information over time about the infant's feeding behaviour and the mothers perception and feelings of satisfaction with the feeding. Scores could be recorded and graphed on the infant's chart. Persistently low scores would identify the babies requiring special help and close follow-up, both in the hospital and by the community health nurse. In the breastfeeding relationship, problems may arise with either the baby or the mother; maternal anxiety or inhibition can also interfere with breastfeeding success. The IBFAT can help discriminate between difficulties on the part of the baby or the mother. In one instance in the study, a mother had great difficulties adjusting to the sensation of the baby on the nipple, while it was clear, from the IBFAT scores and observation, that the baby was alert, responsive and suckling well.

Nursing Education

Maternity nurses in the pre-natal intra-partal and post-partum periods need to be knowledgeable about the

complex breastfeeding relationship. A theoretical basis for the importance of nursing interventions on the development of a satisfactory mother-infant breastfeeding relationship at all stages throughout the childbirth process should be included in the basic nursing education program. In-service education and continuing education programs should disseminate the latest results from nursing and related research studies to nurses in the clinical areas. Research studies such as this one should help develop research based strategies for improving nursing care to the breastfeeding dyad.

The Infant Breastfeeding Assessment Tool could be used to assist the learning of nursing students. By observing and discriminating between the reflexes and behaviours of the infant at the breast, students can develop assessment skills relating to infant breastfeeding behaviour.

Nursing Research

This study could be duplicated in other centers. Although the population from which the sample for this study was taken, did not receive epidural anaesthesia for pain relief in labor, in other centers this is the method of choice. It would be useful to compare babies of mothers who received epidural anaesthesia to see whether these babies are more or less affected than those whose mothers were given analgesia alone. Other studies, already quoted, have

found significantly better neurobehavioural results in babies whose mothers had received epidural anaesthesia compared with those who received analgesia. Further studies need to be done in centres which use other analgesic medications for relief of maternal labour pain. The question still remains whether one analgesic is less depressing to the infant than other medications. Babies of multiparous mothers only should be included in any such studies to rule out the variable parity. Groups of babies with multiparous mothers are more likely to produce an unmedicated comparison group than babies of primiparous mothers.

This study is a first step, the assessment of infant responsiveness by a new assessment tool and scoring scheme.

If the instrument, or modifications of it, can be shown to be accurate, reliable and valid by testing and re-testing, it can be used to provide baseline data for one component of the larger whole, the mother-infant breastfeeding relationship.

The IBFAT might also be used for infant related research, particularly for pre-term infants as they begin to develop effective rooting and suckling behaviours. Since infant feeding competence is a measurement of infant health, it may be useful for identifying infant neurobehavioural deficits.

The major implications of the study however relate to the effect of the sleepy, unresponsive infant on the

mother. While quantitative methodology was appropriate for this study, studies relating to the management of the slow-to-feed infant; studies involving the effects of the infant behaviour on the mother and studies to determine the most effective ways that the environment can be organized to facilitate the mother-infant feeding relationship may best be undertaken using qualitative methodologies. It is anticipated that the follow-up studies from this study will include such approaches.

Assessment of maternal perception needs to be developed either by modification of this instrument or by a separate instrument. In a few instances in this study maternal perception influenced lower scores on the Infant Breast-feeding Assessment Tool. This may have greater significance in mothers and babies with health complications.

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Appendix A

Dear

I am a Registered Nurse completing a post-graduate nursing degree at the School of Nursing, Memorial University.

I am very interested in studying newborn babies to see the effect that sleepiness has on their ability to breastfeed. I am planning to study these babies from April - August, 1986. This project is being guided by Dr. Caroline White.

I am studying newborn babies from the babies' birth until they leave the hospital (usually 4-5 days). I would appreciate your help with this study. Being asked to participate does not mean that there is anything unusual or unhealthy about your baby. The purpose of this study is to find out what makes some babies more sleepy than others. Babies are often sleepy during the first few days and sleepy babies are very discouraging to mothers if they are difficult to feed. Greater knowledge about babies behaviour in the first few days after birth will help both mothers and nurses understand infant feeding difficulties. This may lead to more effective ways to overcome them. Although there is a possibility that having someone observe the baby's feeding may be distracting to you, you may benefit from the study by learning more about your own baby's responses and feeding patterns.

If you agree to participate in this study, your participation will involve observing and recording on a checklist your baby's state of readiness to feed and how well your baby feeds. I am interested in how ready your baby is and how well your baby feeds each time you begin a feeding. You will be given complete directions on how to check the items on the list before you start. It is a short and simple list and will take less than a minute to complete. Sometimes I or one of the nurses will observe the baby feed and complete the checklist also.

Besides recording how your baby feeds, I will need to review your chart and your baby's chart on the day you leave the hospital.

About one month after discharge, with your permission, I will telephone you to find out how you are both doing.

-2-

For the study you and your baby will only be identified by a number and all information obtained will be kept in strict confidence. There will be no way of identifying you or your baby in the report that is made of this study.

You may withdraw from the study at any time by telling me or one of the nurses. This will have no effect on the care you might receive. Should you wish to contact me at any time, my home telephone number is 579-0778.

CONSENT FORM

I agree to participate in the above study, understand its procedures, understand that all material collected by Mrs. Kay Matthews will be held in strict confidence, and that I may withdraw from the study at any time.

NAME

DATE

WITNESS



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APPENDIX B

Human Subject Investigation Committee
St. Clare's Mercy Hospital
LeMarchant Road
St. John's, Newfoundland

Dear Mrs. Gardner,

This letter is to request permission to conduct a nursing research study in the post-partum/nursery units at St. Clare's Mercy Hospital. The study is in partial fulfillment of the requirements for the Masters of Nursing degree at Memorial University and is under the guidance of Caroline White, R.N., Dr. P.H.

The study is an observational study which will involve direct observation and completion of a short assessment questionnaire relating to infant breastfeeding behaviour each time the infant feeds during the first four days after birth. There will be a follow-up telephone call to the mothers 4 weeks following hospital discharge to find out the method of feeding at that time.

I enclose the completed Human Investigations Committee form for review by the committee. The study has already been reviewed by the Human Investigations Committee of the School of Nursing, Memorial University of Newfoundland.

If permission is granted, I will be requesting the opportunity to discuss the study with the Head Nurses of the Maternity Unit, whose assistance will be sought for identification of and initial approach to the mothers of eligible subjects.

I anticipate that data collection will take three to four months, from April 1986 until July 1986.

When the thesis is completed I am willing to donate a copy to the hospital library and to conduct seminars on the topic if requested by hospital staff.

Yours sincerely

M.K. MATTHEWS, R.N., B.N., S.C.M.
Graduate Student



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APPENDIX C

To: Medical Staff

Dear Doctor

I am writing to let you know about a nursing research study in the maternity unit at St. Clare's Hospital which may involve some of your patients. This study is in partial fulfillment of the requirement of Masters of Nursing degree at Memorial University under the guidance of Caroline White, R.N., Dr. P.H.

As a nurse I am very interested in babies who have difficulties breastfeeding in the first few days after birth. In the healthy neonate this is usually due to sleepiness and reluctance to feed, which is usually assumed to be related to maternal labor analgesia. A number of research studies have demonstrated the effects of various medications on the infant's neuro behaviour for up to five days post-birth. However very few have specifically investigated the effect on breastfeeding. The study will describe the breastfeeding pattern in babies of unmedicated mothers compared with babies whose mothers were medicated.

Participation by the mothers and their babies is voluntary. After the mother has signed consent, the study will involve a short assessment of the infant's breastfeeding behaviour at each feed until the baby is feeding well. This assessment may be done by the nurses, the mother or me. There will be a follow-up telephone call 4 weeks following hospital discharge to determine the method of feeding at that time.

The study has been reviewed by the Human Subjects Investigation Committee at St. Clare's and the School of Nursing, Memorial University.

If you have any questions or concerns relating to the study, I will be happy to discuss them with you. My home telephone number is 579-0778.

Yours sincerely

 M.K. MATTHEWS, R.N., B.N., S.C.M.
 Graduate Student



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APPENDIX D

For Neo-natal Nursery Nurses

Permission has been granted by the hospital administration of St. Clare's for a nursing research study of infant breastfeeding behaviour in the first few days of life. As the investigator I will need your help to make the initial approach to the mother to give her a letter of explanation and obtain her permission for me to discuss the study with her and seek her consent. This should be done only if her condition is satisfactory and she has rested.

Selection Criteria:

Breastfeeding Mothers whose babies meet the following criteria:

1. Healthy full term (38-42 weeks gestation) newborn infants.
2. Appropriate weight for gestational age.
3. Normal apgar scores (> 7 at 1 minute, ≥ 8 at 5 minutes)
4. Delivered vaginally after uncomplicated labors. (May be induced or stimulated labors.)
5. Uncomplicated pregnancies.
6. The babies' mothers received either Alphaprodine (Nisentil) or Meperidine (Demerol) or No Medication in labor. Do not include if barbiturates were given.

Explanation of the Study to the Patient
(to be used by intermediary staff nurse)

I would like to take this opportunity to give you this letter explaining a nursing research study. The nurse doing the study is interested in studying newborn babies to see how long it takes them to start breastfeeding well and the effect of sleepiness on their ability to breastfeed.

I will leave the letter with you and if you are interested I will let the nurse, Mrs. Matthews, know and she will come and explain more fully what is involved and answer your questions. Agreeing to have Mrs. Matthews talk to you about the study in no way commits you to participate in it. Are you willing to have her come to see you?

Check the answer which best describes the baby's feeding behaviours at this feed.

1. When you picked baby up to feed was he/she:
- | | | | |
|--|-----------|--------------------|-----------|
| a) deeply asleep (eyes closed, no observable movements except breathing) | b) drowsy | c) quiet and alert | d) crying |
| — | — | — | — |
2. In order to get the baby to begin this feed, did you or the nurse have to:
- | | | | |
|--|--|---|-------------------------|
| a) just place the baby on the breast as no effort was needed | b) use mild stimulation such as unbundling, patting or burping | c) unbundle baby, sit baby back and forward, rub baby's body or limbs vigorously at the beginning and during the feeding. | d) could not be aroused |
| — | — | — | — |
3. Rooting (definition: at touch of nipple to cheek baby's head turns towards the nipple, the mouth opens and baby attempts to fix mouth on the nipple). When the baby was placed beside the breast, he/she:
- | | | | |
|-------------------------------|---|------------------------------------|------------------------|
| a) rooted effectively at once | b) needed some coaxing or prompting or encouragement to root. | c) rooted poorly even with coaxing | d) did not try to root |
| — | — | — | — |
4. How long from placing the baby at the breast does the baby start to feed well (constant sucking through the length of the feed, with some pauses, on either/or both breasts).
- | | | | |
|---------------------------|-----------------|--------------------|-----------------|
| a) starts to feed at once | b) 3-10 minutes | c) over 10 minutes | d) did not feed |
| — | — | — | — |
5. Which of the following phrases describes the baby's feeding pattern at this feed?
- | | | | |
|----------------------|---|---|--------------------------------------|
| a) baby did not suck | b) sucked poorly (weak sucking, some sucking efforts for short periods) | c) sucked fairly well (sucked off and on, but needed encouragement) | d) sucked well on c. or both breasts |
| — | — | — | — |
6. How do you feel about the way the baby fed at this feeding?
- | | | | |
|-----------------|------------|-------------------|----------------|
| a) very pleased | b) pleased | c) fairly pleased | d) not pleased |
| — | — | — | — |

APPENDIX F

Date of Birth
Time of Birth
Time of First Breastfeed

Infant #No.

SEX

B.W.

D.W.

12

11

10

9

8

7

6

5

4

3

2

1

BIRTH

0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72 76 80 84 88 92 96

HOURS FROM BIRTH

DAY 1

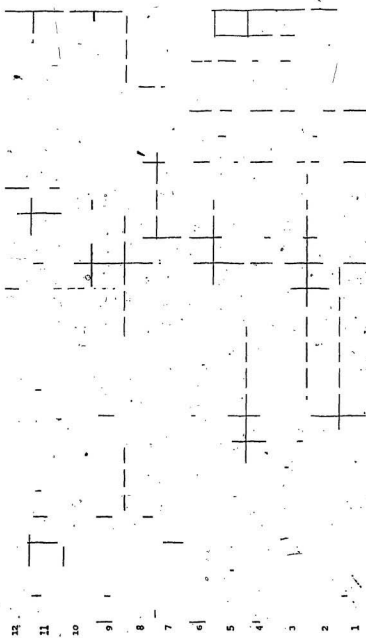
DAY 2

DAY 3

DAY 4

IBPAT

SCORES





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APPENDIX G

To: Research Assistants (R.N.'s)

Dear

Thank you for agreeing to help me with the study of infant breastfeeding behaviour in the first few days of life:

As the investigator, I must be blind to the medication group in which the babies are placed. Therefore, I have developed the following protocol for you to follow to make sure that the babies fit the selection criteria and that I am obtaining the required numbers in each group.

1. After the names of the eligible babies are collected from the neonatal nursery I request that you record separately in a file, into which of the three medication groups the baby fits. This information must be kept from me.
2. Check from the charts that the baby fits the selection criteria for inclusion in the study.
3. It is anticipated that the groups will not fill evenly, one may fill more rapidly than another. It may be necessary towards the end of the study to make sure that certain groups are being filled, even if it means exceeding 20 in the rapidly filled group.

Selection Criteria

1. Babies who were delivered following normal pregnancy, labor and delivery (may include induced or augmented labors).
2. Babies whose mothers received either Alphaprodine (Nisentil) or Meperidine (Demerol) or No Medication in labor. (Do not include if barbiturates were given.)
3. Babies who are 38-42 weeks gestation and of appropriate weight for gestational age.
4. Babies in whom there was no reported fetal distress and whose appars were at least 7-8.

Again, many thanks for your contribution to nursing research.

Yours sincerely

M.K. MATHEWS, R.N., B.N., S.C.M.
Graduate Student

APPENDIX I
SCORING SCHEME
INFANT BREASTFEEDING ASSESSMENT TOOL

106

Check the answer which best describes the baby's feeding behaviours at this feed.

1. When you picked baby up to feed was he/she:
- | | | | |
|--|-------------|--------------------|-------------|
| a) deeply asleep (eyes closed, no observable movements except breathing) | b) drowsy | c) quiet and alert | d) crying |
| <u> </u> | <u> </u> | <u> </u> | <u> </u> |
2. In order to get the baby to begin this feed, did you or the nurse have to:
- | | | | |
|--|--|---|-------------------------|
| a) just place the baby on the breast as no effort was needed | b) use mild stimulation such as unbundling, patting or burping | c) unbundle baby, sit baby back and forward, rub baby's body or lift vigorously at the beginning and during the feeding | d) could not be aroused |
| <u> 3 </u> | <u> 2 </u> | <u> 1 </u> | <u> 0 </u> |
3. Rooting (definition: at touch of nipple to cheek baby's head turns towards the nipple, the mouth opens and baby attempts to fix mouth on the nipple). When the baby was placed beside the breast, he/she:
- | | | | |
|-------------------------------|---|------------------------------------|------------------------|
| a) rooted effectively at once | b) needed some coaxing prompting or encouragement to root | c) rooted poorly even with coaxing | d) did not try to root |
| <u> 3 </u> | <u> 2 </u> | <u> 1 </u> | <u> 0 </u> |
4. How long from placing the baby at the breast does the baby start to feed well (constant sucking through the length of the feed, with some pauses, on either/or both breasts).
- | | | | |
|---------------------------|-----------------|--------------------|-----------------|
| a) starts to feed at once | b) 3-10 minutes | c) over 10 minutes | d) did not feed |
| <u> 3 </u> | <u> 2 </u> | <u> 1 </u> | <u> 0 </u> |
5. Which of the following phrases describes the baby's feeding pattern at this feed?
- | | | | |
|----------------------|---|---|---------------------------------------|
| a) baby did not suck | b) sucked poorly (weak sucking, some sucking efforts for short periods) | c) sucked fairly well (sucked off and on, but needed encouragement) | d) sucked well on one or both breasts |
| <u> 0 </u> | <u> 1 </u> | <u> 2 </u> | <u> 3 </u> |
6. How do you feel about the way the baby fed at this feeding?
- | | | | |
|-----------------|-------------|-------------------|----------------|
| a) very pleased | b) pleased | c) fairly pleased | d) not pleased |
| <u> </u> | <u> </u> | <u> </u> | <u> </u> |





