MATERNAL RESPONSES TO INFANT CRYING DURING THE FIRST POSTPARTUM MONTH

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Maternal Responses to Infant Crying During the First Postpartum Month

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Abstract

The purpose of this research was to investigate and describe how primiparous mothers interpret and respond to their infants' crying during the first postpartum month in order to assist nurses in providing anticipatory guidance and/or therapeutic intervention associated with infant crying as a maternal caretaking concern.

An exploratory descriptive design was selected for this study. The sample consisted of 40 healthy primiparous mothers and their healthy, full-term neonates. A structured diary designed by the investigator, was used to collect data on the mothers' responses to their infants' crying during the third postpartum week. Mothers' perceptions and expectations of their infants' crying were measured using the Neonatal Perception Inventories. Data were analyzed using descriptive and inferential statistics.

The study revealed that infant crying causes a considerable amount of worry for mothers during the first postpartum month. There was a significant positive correlation between the amount of worry and the average number of daily crying episodes. Mothers most often attributed the cause of crying to physical needs rather than social needs. Maternal behavioral responses consisted of picking up the infant and trying different soothing interventions of which

feeding was considered to be the most effective. A variety of emotional maternal responses were evoked by the infant's crying. Mothers whose infants were difficult to console expressed negative feelings such as worry, anxiety and frustration. There was a positive correlation between high worry scores and negative perception of the infant at 4 weeks postpartum.

Although nurses actively participate in postpartum mother-infant care, they were infrequently identified as resource people. The few mothers who discussed their infants' crying with nurses did not find the advice very helpful for managing their infants' crying.

Findings indicate that perinatal nurses need to be aware of neonatal crying as a maternal caretaking concern and be prepared to utilize current, research-based information to assist mothers with the management of their neonates' crying.

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CHAPTER I

Introduction

The first eight to ten weeks postpartum are considered to be a period of mutual adaptation for both mother and infant (Sander, 1976). During this period the new mother has many tasks to perform, including that of learning to care for and meet the needs of her infant. One of the primary roles of nurses working with mothers during the early postpartal period is teaching mother and infant care. Part of this teaching includes assisting the mother in learning about her infant's behavioral capabilities.

Crying is one infant behavior which can be very upsetting to the new mother until she learns what it means and how to respond to this behavior (Mercer, 1986; Sumner & Fritsch, 1977). Nurses offering guidance to new mothers concerning infant crying should understand how mothers perceive infant crying and how it affects the mother-infant relationship.

The literature contains many references to the influence of infant crying on the development of the mother-infant interactive process (Bell, 1974; Bell & Ainsworth, 1972; Bowlby, 1969; Moss, 1967; Rheingold 1969; Robson & Moss, 1970; Thoman, 1975; Wolff, 1969). There are also a number of theories to support the significance of the

mother's response to her infant's crying behavior on the development of the mother-infant interactive process. However, despite the importance of the infant cry and the mother's response to such crying, the literature contains very little research on the mother's interpretation of and response to neonatal crying as a caretaking concern. This study will contribute to the research on the problem of the mother's concern regarding infant crying by investigating and describing primiparous mothers' responses to their infants' crying during the first postpartum month.

Problem Statement

Research has indicated that neonatal crying is a prime concern for new mothers (Adams, 1963; Brown, 1967; Dunn, 1984; Filmore & Taylor, 1976; Harris, 1979). During the early postnatal weeks the mother's interactions with her infant consist mainly of feeding, comforting and soothing (Korner, 1974). At this time when the mother is learning how to interpret her infant's cues, crying can be particularly disturbing (Mercer, 1986). Mothers who are unable to console their crying infants often blame themselves for their infants' behavior and consider themselves failures as mothers (Brazelton, 1962; Kaplan, 1978; Leifer, 1980). Researchers have also indicated that

infant irritability and inconsolability lead to feelings of helplessness, depression and rejecting attitudes among mothers (Brazelton, 1961; Prechl, 1963; Pruett & Leonard, 1978). Persistent crying is also linked with child abuse (Frodi, 1981; Kemp & Helfer, 1972; Kirkland, 1985; Korner, 1979; Murray, 1979; Weston, 1968). The literature indicates that an inconsolable crying infant combined with the mother's depleted self-esteem and helplessness may trigger the expression of abusive behavior. Thus, infant crying is an important factor which could play a disruptive role in the developing relationship between the mother and her infant.

The average new mother in today's society has little if any previous experience with caring for newborn infants, therefore mothering behavior must be learned. Nurses working with new mothers during the early postpartum period have an excellent opportunity to assist these mothers in learning about infant behavior and to offer them guidance on caregiving concerns such as crying. However, before nurses can provide appropriate information and anticipatory guidance to new mothers concerning infant crying, it is necessary for them to have an adequate understanding of such behavior and of the way it affects the mother. The information gathered by this study should be very helpful for nurses planning anticipatory guidance and/or therapeutic

nursing intervention associated with infant crying as a maternal caretaking concern. The information obtained may also contribute to the building of an appropriate theory base to assist nurses in providing help and support to mothers concerning infant crying behavior. The researcher's reference to mother-infant relationship does not underestimate in anyway the father's contribution to parenting during the neonatal period. However, despite the increased family-centred approach in maternity care, the mother is still the focus of perinatal teaching and nursing care and therefore this study included only mothers and their infants.

The Purpose

The purpose of this research is to investigate and describe how primiparous mothers interpret and respond to their infants' crying during the first postpartum month. The ultimate purpose is to contribute to the nurse's goal of fostering a positive mother-infant relationship.

Specific Objectives

This study is intended to:

1. Identify the causes mothers attribute to the

crying behavior of their neonates;

2. Identify and describe the maternal feelings evoked by the neonates' crying, as reported by the mothers;

3. Identify and describe the interventions used by mothers to console their crying neonates;

4. Describe the effectiveness of the above interventions, as reported by the mothers; and

5. Identify the mother's expectations and perceptions of their neonates' crying behavior.

Definition of Terms

Crying Behavior	A behavioral state of the neonate characterized by crying vocalizations associated with facial grimaces, color changes, and/or increased body movements.
Crying Episodes	Incidents of crying separated by more than a momentary pause and lasting more than two seconds.
Perception	The mother's thoughts and beliefs about her neonate as measured by Broussard's Neonatal Perception Inventory.

Behavioral Response Interventions used by the mother to console her crying infant.

Emotional Response The mother's stated feelings evoked by her infant's crying.

Conceptual Framework

The conceptual framework for this study was based on Thoman's (1975) model for the study of mother-infant interaction. Thoman (1975) suggests that the mother and infant constitute a system which is psychobiological in nature and characterized by mutual modification of behavior. The mother and infant both enter the system with their individual characteristics that develop before the infant's birth, and their interaction afterwards develops as a consequence of the synchrony of their behaviors. In order for this synchronous relationship to develop, the infant must be capable of signalling his/her needs and responding to maternal intervention. The mother must have the ability to perceive the cues given by the infant and to respond appropriately. Thoman (1975) suggests that the mother's response is considered to be appropriate if it causes a change in the infant's behavior toward a level of greater organization. To the extent that the mother and infant are mutually responsive, the relationship of the pair should

develop in such a way so as to facilitate the infant's development. Thoman (1975) depicted her model "by the following triadic sequence: Infant behavior - Maternal behavior - Infant behavior" (p. 180). The model indicates the ongoing reciprocal nature of the mother-infant relationship. "If an infant is behaving in a particular way before the mother intervenes, the behavior of the infant after the intervention will indicate the effectiveness of the mother's response" (Thoman, 1975, p. 180).

In the present study, the infant's crying was seen as the behavioral cue and the focus of interest was the mothers interpretation of the cue, her emotional and behavioral response to it and the infants behavior after the mother's response. Thoman's (1975) mother-infant interactional model and the review of pertinent literature guided the construction of the conceptual model for the investigation of the mother's response to her crying infant during the first postpartum month. Figure 1 is a visual representation of this model.

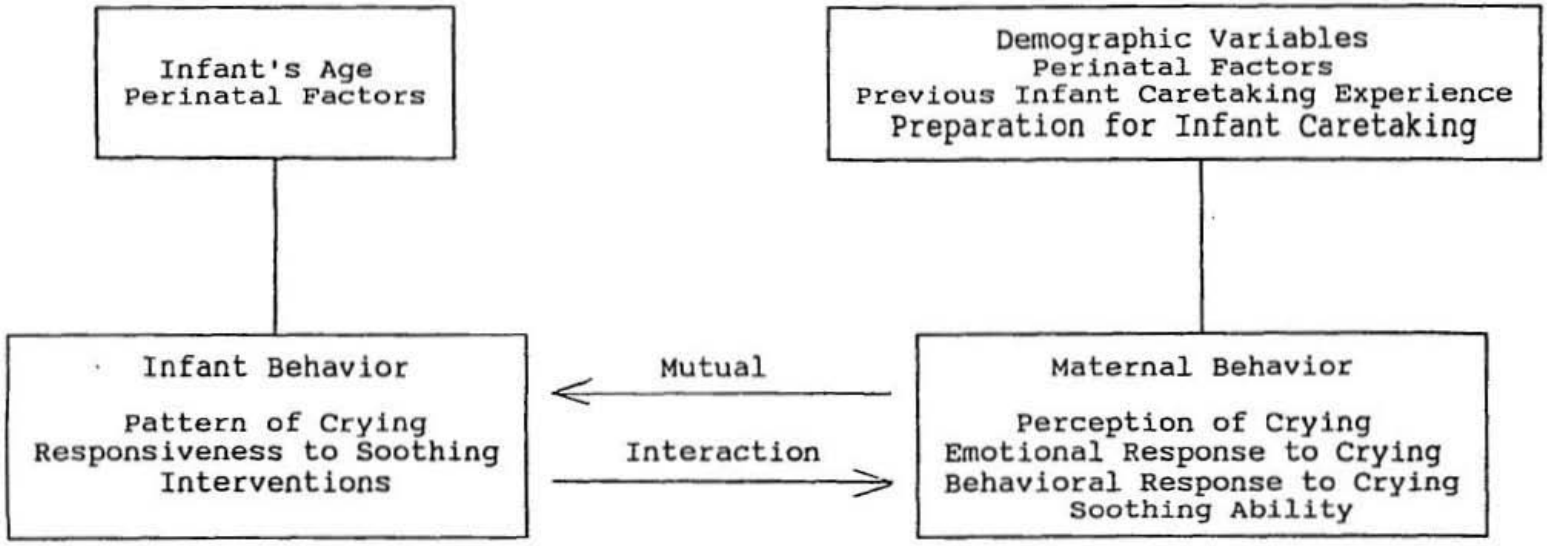

Figure 1. Conceptualization of the Maternal-Infant Interaction During Infant Crying

CHAPTER II

Literature Review

The infant cry has been the subject of numerous studies. A number of researchers have focused on the mechanisms of crying (Bosma, Truby & Lind, 1965), the sounds produced (Ostwald, 1972; Truby & Lind, 1965), and the diagnostic value of the cry (Golub & Corwin, 1982; Karelitz & Fisichelli, 1962; Koivisto, 1987; Lester, 1976; Michelsson, Sirvos & Wasz-Hockert, 1977; Ostwald, Phibbs & Fox, 1968; Prechtl, Theorell, Gramsbergen & Lind, 1969). However, very few researchers have investigated why, when and how much, infants cry (Aldrich, Sung & Knop, 1945a, 1945b, 1945c; Brazelton, 1962; Rebelsky & Black, 1972; Wolff, 1969). The maternal response to infant crying has been the subject of very little research since the pioneering studies of Bell and Ainsworth (1972). The purpose of this literature review is to examine and analyze the literature associated with infant crying and with the maternal response to that crying as a caretaking concern. Five major subject areas will be reviewed as follows; the nature of infant crying, causes of infant crying, interventions that soothe crying infants, mothers' responses to infants' crying and mothers' perceptions and expectations of their infants.

The Nature of Infant Crying

Crying is a universal behavior of all human infants. However the amount, frequency and duration of crying episodes vary among infants. Aldrich et al. (1945b, 1945c) studied the crying of newborn infants during their stay in a hospital nursery and also during the first month at home. In the hospital study, 24-hour observations were made of 50 infants during their first eight days of life. Results indicated that the average amount of crying per infant was 936 minutes during 8 days or 117 minutes per day. In the home study, mothers kept 24-hour records of their infants' crying. From these records, it was concluded that infants averaged 4.0 episodes of crying per day. The most significant finding in this study was that the babies at home averaged 4.0 crying episodes per day in contrast to an average of 11.9 crying episodes per day while in the hospital nursery. It could be implied from this data that the crying reduced because of the mothering in the home environment. However, as the researchers noted, the difference in the ages of the babies studied at home, as compared with that of the babies studied in the hospital may account for the differences in the amount of crying. Also the periods of observation in the home study varied from 8 to 22 days. Brazelton (1962) studied 80 healthy infants

during their first 12 weeks at home, in an attempt to estimate the incidence of crying in normal infants. Reports based on the mothers' daily records of their infants' crying showed an average of 1.75 hours of crying per day during the second week, which gradually increased to 2.75 hours per day at six weeks and decreased in quantity thereafter. Rebelsky and Black (1972) also studied the crying patterns of healthy infants during their first 12 weeks of life but found the amount of crying to be considerably less than in Brazelton's study. Twenty-four hour tape recordings of 10 infants' vocalizations in their own homes provided data on the amount of daily crying, the periodicity of crying and the changes in crying over the 12 week period. The average number of minutes of infant crying per day was 22 minutes between 1 and 3 weeks of age, increasing to 34 minutes between 6 and 7 weeks and decreasing to a low of 14 minutes of crying per day at 12 weeks of age. The considerable differences in the amount of crying reported by Brazelton (1962) and that reported by Rebelsky and Black (1972) may be attributed to the different methodology of these studies. However, it is difficult to further compare the two studies since Brazelton does not give a clear definition of crying.

Bell and Ainsworth (1972), in a naturalistic, longitudinal study of 26 infant-mother pairs reported an overall reduction in duration of crying from a median of 7.7

minutes per hour in the first quarter of the first year of life to 4.4 minutes per hour in the fourth quarter. Crying in the first three months ranged from 21 minutes per hour to almost no crying at all. No comparable decline was reported in frequency of crying. Episodes of crying were observed to occur at a median frequency of 4 per hour throughout the first year. These data, however, are based on 3 to 4 hour daily observations and the time of day for those observations was not included in the report. It is not possible to compare these results with the above studies since there is no specific reference to neonatal crying in Bell and Ainsworths' (1972) study.

Bernal (1972) studied 77 mother-baby pairs, during the first 10 days after the babies were born. Daily diary records were kept by the mothers for the 10 day period, to provide data on infant crying. The sample as a whole showed a 24-hour pattern in crying, with a peak between 6 p.m. and midnight. Breast-fed first babies cried an average of 109 minutes per day as compared to 80 minutes per day for breast-fed second babies. In comparing differences between the breast-fed and bottle-fed second babies it was found that the breast-fed babies cried more frequently after feeds and that the duration of crying was longer. Unfortunately, there was no comparison made between the crying of breast-fed and bottle-fed first babies.

The acoustic features of infant cry sounds have also been studied and analyzed by a variety of techniques. Wasz-Hockert, Lind, Vuorenkoski, Partanen and Valanne (1968), using spectrographic recordings, identified four distinct crying patterns which they called: the birth cry, the hunger cry, the pain cry and the pleasure cry. The birth cry is characterized as voiceless, tense, with a flat or falling melody and a duration of 1 second. The pain cry is longer, more tense, higher in pitch and has a flat melodic form. The hunger cry is shorter and primarily characterized by a rising-falling melody form. Pleasure cries are described as flat in form, nasal and voiced with extreme variability in pitch.

Wolff (1969) also using spectrographic recordings identified three distinct crying patterns: the basic pattern, or rhythmical cry, the mad or angry cry and the pain cry. The basic or rhythmical cry was described as consisting of an initial cry proper, followed by a brief silence, a short inspiratory whistle and another brief rest period before the next cry proper begins. The pain cry is characterized by a long initial cry, with a sudden and loud onset, followed by breath holding, then an inspiratory gasp followed by a short rest before the next cry. The mad or angry cry is described as a variation of the basic pattern but with more air forced through the vocal cords. The

differences in Wolff's (1969) results and those of Wasz-Hockert et al. (1968) may be due to different methodology. Wolff's analysis of infant crying included 18 newborn infants, observed in their homes for a period of 30 hours per week. Whereas, Wasz-Hockert et al. analyzed the cries of 351 infants in six age groups, from birth to 7 months.

Prechtl et al. (1969) studied the cry patterns of a sample of 21 full-term, normal and abnormal infants. They concluded that in normal infants the duration and the intervals between individual cries in a crying bout are characteristic for the individual baby. Aldrich et al. (1945b) also emphasized the individuality of the infant's cry. They noted that many infants expressed themselves by very short grunting sounds whereas others produced persistent and intense crying sounds. Verification for the individual characteristics of the neonate's cry also comes from studies showing that mothers are able to identify their own newborns by their cry (Fromby, 1967; Greenberg, Rosenberg & Lind, 1973; Morsback & Bunting, 1979; Valanne, Vuorenkoski, Partanen, Lind and Wasz-Hockert, 1967).

The above studies give valuable information on the infant's cry. However, there is no general agreement in the literature as to how much crying can be expected from the average normal newborn infant during the first month at home. Most studies of infant crying report the duration

time of crying per hour or day rather than the number of episodes of crying per day. The latter information may be a more useful index since it indicates how often the average normal neonate can be expected to use the cry signal within a 24-hour period.

Causes of Infant Crying

The causes of infant crying listed in the literature are considered to be of a physical and social nature such as, hunger, temperature change, boredom, loneliness, physical pain, sudden noises, desire for physical contact, fatigue, colic, being undressed, tension, and over-stimulation (Brazelton, 1962; Dunn, 1977; Illingworth, 1955, 1979; Jolly, 1985; Valman, 1980; Wolff, 1969). Some of the common causes of crying during the neonatal period are now discussed. Although some of these causes are fairly obvious there has been very little research on the topic since Wolff's (1969) detailed study of infant crying.

Hunger

Hunger is identified as the most common casual factor that can provoke crying during the neonatal period (Illingworth, 1979; Wolff, 1969). Wolff (1969) was one of the first researchers to study the relationship of crying

to hunger. His experiments with 12 crying, 4-day-old babies before and after feedings led him to the not so surprising conclusion that being fed rather than being held was the reason babies stopped crying. Feeding involves sucking, swallowing, having a full stomach and absorbing nourishment, any or all of which may have a soothing effect on the infant. Therefore Wolff conducted further experiments to show that a full stomach rather than the process of feeding caused the termination of crying. By studying seven full-term neonates who because of medical problems were fed by stomach tubes, Wolff was able to isolate the effects of gastric filling from those of sucking, the effects of sucking from those of swallowing and the effects of sucking and swallowing from those of gastric filling. The result showed that a full stomach, rather than sucking or swallowing was most effective in stopping the hungry neonate from crying. However, this experiment was conducted on a small number of infants (N=7) in unusual circumstances and therefore should be interpreted with caution.

Temperature

Wolff (1969) found that infants kept at a temperature of 78 degrees fahrenheit, cried more and slept less than when they were kept in temperatures of 88-90 degrees fahrenheit. He also noted that the cooling effect of a wet

diaper, rather than the wet or soiled diaper itself was a potent cause of distress.

Being Undressed

Wolff (1969) noted that some neonates began after the third day to cry when they were undressed and continued this reaction until the end of the third or fourth week. Temperature was not considered to be the critical factor in this case since the babies' reactions were similar while in controlled temperatures. The elimination of skin contact and the release from the confinement of clothing was considered to be the cause of crying. Those infants stopped crying only when they were swaddled or fully dressed. The texture of the clothing was also important. Plastic or rubber sheets were less effective than towels or blankets for consoling the infants.

Physical Pain

There is no doubt that neonates will cry in response to physical pain, such as that experienced during a blood test or some other physical assault. However, it appears to be more difficult to judge how much if any of a neonate's crying is due to internal pain such as gastrointestinal discomforts (Dunn, 1977; Wolff, 1969). The term "colic" is often used as an explanation for excessive crying of unknown

cause in normal infants less than 3 months of age (Bruce, 1961; Illingworth, 1954; Wessel, Cobb, Jackson, Harris & Detwiler, 1954). It has been traditionally assumed that these infants are crying because of abdominal pain due to gas.

Tension

Brazelton's (1962) study of unexplained crying periods among normal infants, involved 80 mothers who kept 24-hour diaries of their infants' crying behavior for a period of 12 weeks. Advice was given to the mothers as to feeding and management of crying episodes, so as to eliminate obvious reasons for crying and to eliminate excessive environmental tension which could be an additive factor. Brazelton concluded that a certain amount of crying is necessary and is to be expected in normal, emotionally-secure, well-fed infants. He also suggested that neonates are acutely sensitive to tension in their environment and may need to express their own tensions at specific times throughout the day. Family or maternal tension has been reported by some researchers to be a cause of excessive crying in infants (Stewart et al. 1954; Wessel et al., 1954). However, there is a lack of recent research on this topic.

Social Reasons

The cry of the infant is considered to be a powerful social signal which is very effective in bringing the caretaker to the infant's side (Ainsworth, 1973; Bell, 1977; Bowlby, 1969; Emde, Gaensbauer and Harmon, 1976). As pointed out by Brazelton (1962) and Rheingold (1969) infant crying is at first a direct expression of discomfort which soon changes to a plea for the mothering that he or she requires. Jolly (1985) suggests that not all newborn babies adjust easily to life outside the security of the uterus and they cry for the physical comfort of their mothers' bodies. Illingworth (1979) indicates that many mothers fail to realize that the neonate cries for company. They mistakingly attribute the causes of crying to hunger and may often give unnecessary feeds. However, Illingworth (1980) has also pointed out that "we cannot always know the reason for a baby's cry" (p. 7).

Mothers in Wolff's study (1969) noted that when their infants were approximately three weeks old they began to cry for attention. Wolff also observed that at the age of four weeks, infants tended to cry when a person went out of sight and to stop crying as soon as the person returned again. Similarly, Bell and Ainsworth (1972) reported that during the first three months, crying occurred more often when the mother was out of sight than when she was in proximity.

Interventions That Soothe Crying Infants

Most mothers and other caregivers know that infants can usually be soothed by picking them up and putting them to their shoulder. However, infants differ significantly from each other in how soothable they are (Korner & Thoman, 1972). Mothers who have babies that are difficult to soothe may have to try many different interventions to find out which one is most effective. The various interventions reported to be effective in soothing the crying infant will be discussed under the following headings: sucking, movement, motor restraint and sound.

Sucking

It is common knowledge that most babies will relax when given a nipple to suck. Kessen and Mandler (1961), in studying inhibitors of anxiety in infants, suggested that the sucking response inhibits the infant's distress even if sucking is not associated with food ingestion. This suggestion was supported by research which demonstrated that non-nutritive sucking reduced general movements of newborn babies (Kessen & Leutzendorff, 1963) and arrested crying activity (Wolff, 1969). A common form of non-nutritive sucking is that provided by the use of a pacifier which is sometimes referred to as a "dummy" or "comforter". There

is considerable support in the literature for the effectiveness of the pacifier in soothing infants (Anderson, 1986; Darbyshire, 1985; Spock, 1977; Valman, 1980; Wolff, 1969). Although not all authors prefer the use of a pacifier, they do agree that it is not harmful unless it is coated with sweet substances which lead to dental caries (Jolly, 1985; Illingworth, 1979).

Movement

Movement occurs in a number of soothing interventions, such as: picking up the baby, walking, rocking, swinging, changing the baby's position, and providing carriage or car rides. Rocking has been investigated and its effectiveness as a soother is reported to be dependent on its type and speed. Byrne and Horowitz's (1981) study of 36 infants, 24-72 hours of age, showed that infants who were rocked quieted more quickly than infants who were either picked up and held at the experimenter's shoulder or not given any form of intervention. Furthermore, the results showed that rocking a crying baby vertically and intermittently promoted a bright-alert state, whereas continuous horizontal rocking induced the baby to sleep. Studies have also shown that in order to be most effective, rocking must be carried out at a rate of 60 rocks per minute (Ambrose, 1969; TerVrught & Pederson, 1973).

Korner and Thoman (1972) studied the effectiveness of soothing interventions on 40 newborns, 2 to 4 days old. They reported that vestibular-proprioceptive stimulation, entailed in being lifted and maintained in the upright position, had a powerful soothing effect. The results of this study not only showed that some interventions were more effective than others but also that there was a highly significant individual difference among infants in how soothable they are. Wolff (1969) reported that in comparing the effectiveness of different qualities of stimulation on crying, picking up, together with pacifier sucking and swaddling were among the most effective to stop crying. Bell and Ainsworth (1972) in their study of 26 mother-infant pairs found that picking up and holding the infant was a commonly used intervention that was effective in more than 80% of the instances in which it occurs.

The simple act of walking with the infant held in a baby carrier or sling on the back or front of a parent can be an effective soother (Jolly, 1985; Kirkland, 1985; Leach, 1983; Rozdilsky & Banet, 1972; Valman, 1980). The advantage to this type of carrying is the combination of movement and the firm body contact. Car rides and stroller or buggy rides are reported as being very helpful in putting a crying baby to sleep (Newton, 1983; Rozdilsky & Banet, 1972).

Motor Restraint

The ancient art of swaddling has been found useful as a soothing technique for some infants. Wolff (1969) indicates that in order for swaddling to be effective it must be done so that the infant is immobilized, thus generating a constant background of tactile stimulation. Brackbill (1971) studied the cumulative effects of continuous stimulation on arousal level in infants. Twenty-four one month old infants served as their own controls under five different, randomly-ordered conditions on five consecutive days. These conditions were no extra stimulation, auditory stimulation, visual stimulation, proprioceptive-tactile stimulation and temperature stimulation. Results of the study showed that continuous stimulation depresses the level of arousal and has a marked pacifying effect on infants. Furthermore, the effect is cumulative across modalities. In this study the proprioceptive-tactile stimulation was provided by swaddling the infant from neck to toes in long, narrow strips of flannel. This procedure was reported to be very effective in reducing crying whether it was used alone or in combination with sound stimulation. Wrapping infants in blankets and placing them in a small space such as a car bed or small bassinet so as to restrict their movements is also

reported to be an effective pacifier (Spock, 1977; Valman, 1980).

Sound

Wolff (1969) refered to different types of sounds as having a quietening effect on crying infants. Harsh sounds such as those produced by a rattle temporarily arrested crying in a one week old infant whereas the human voice was more effective as a soother for the two week old infant. Thoman, Korner and Williams (1977), in a controlled study of 6 newborn infants, demonstrated that the human voice can be an effective soother when combined with other interventions, such as picking up and holding the infant.

Brackbill (1970) compared the effects of no sound, continuous sound and intermittent sound background conditions on the level of arousal of 18 normal, one month old infants. The results showed that intermittent stimulation increased arousal level, relative to a no-sound background, and that continuous stimulation decreased it. An interesting finding was that infants subjected to intermittent sound spent 26% of the time crying whereas there was no crying when they were subjected to continuous sound.

Not all the soothing interventions discussed in the literature have been experimentally tested for their

effectiveness. However, for those that were tested, the experiments were conducted in a laboratory or other controlled setting. Therefore, conclusions cannot be made on the effectiveness of these soothing interventions when used in the home environment. A study conducted by Ames, Gavel, Khazaie and Farrell (1984) provides some information on the types of soothing interventions used in the home and their effectiveness as perceived by the mothers. Information on crying and soothing was obtained from a sample of 337 mothers with infants age 2 to 18 weeks. As part of a questionnaire, the mothers were asked to rate the effectiveness of soothing techniques, which they had used, as either very, somewhat or not at all effective. The most highly-rated techniques were walking, rocking, buggy ride and car ride. However, car ride was an infrequently used technique. The researchers concluded that mothers do perceive differences in effectiveness among the soothing techniques which they have tried, and that some of the soothing methods that have been shown in experimental research to be highly effective, are not perceived as such by mothers. This included swaddling, oral pacifiers, music, singing and talking.

Maternal Response to Infant Crying

The infant cry is considered to be an important elicitor of caregiving behavior (Ainsworth, 1969; Bowlby, 1969). However, the cry of the infant is also said to stimulate intense emotions and evoke powerful reactions from those who hear it (Ostwald, 1972). Frodi, Lamb, Leavitt and Donovan (1978) studied 48 mother-father physiological responses to infant smiles and cries. The subjects' skin conductance and blood pressures were monitored as they watched 6-minute video presentations of crying and smiling infants. The smiling infant elicited positive emotions and negligible changes in autonomic arousal, whereas the crying infant was perceived as aversive and elicited increases in diastolic blood-pressure and skin-conductance. Boukydis and Burgess (1982) also investigated adult physiological responses to infant cries. Non-parents, primiparous parents and multiparous parents were included in this study. The subjects listened to tapes consisting of cries ordered according to sound spectrographic features and infant temperament ratings. Levels of arousal were measured by skin potential response. Primiparous parents showed their highest levels of arousal to average cries, whereas multiparous parents and non-parents showed their highest levels of arousal to difficult cries and lowest levels to

easy cries. It was suggested that fundamental frequency and pauses, which discriminate the cries of infants varying in risk or temperament status, may also be associated with predictable differences in caretaker perception of and interpretation of cries.

Although these and other studies assume that the mother's perception of her infant's cry may determine which cries are responded to in a positive way, researchers have shown that the mother's response is not influenced by cry patterns alone. As part of a longitudinal study of mothers and babies initiated by Richards and Bernal (1972), the mother's response to infant crying during the first 10 days of life was studied in some detail. Bernal reported from diary data on those mothers, that their knowledge of how long a time had elapsed from the last feeding and the adequacy of the feeding determined the mothers response and also how quickly they responded. Comparison of multiparous mothers with primiparous mothers found the former to respond more quickly, more often by feeding, less often by holding or carrying and to be less likely not to respond at all. Furthermore, breast-feeding mothers were more likely than bottle-feeding mothers to respond quickly to crying. Bell and Ainsworth's (1972) study of infant crying and maternal responsiveness, found that mothers tend to pick up their crying infants more frequently than intervening in any other

way. However, some mothers were deliberately unresponsive to their infants' crying for fear they would spoil their baby. The researchers suggested that maternal tendencies to delay responses or to ignore crying altogether, seem to be relatively stable characteristics which were probably influenced by the mother's personality. No reference was made as to the method of feeding used by the mothers in this study and no distinction was made between multiparous and primiparous responses. The above studies focus exclusively on the mother's motor response, therefore providing no information as to how the mother's affective response to infant crying influences her actions.

One of the earliest studies to investigate mother's thoughts, feelings and actions in relation to infant crying was conducted by Harris (1979). Thirty-five primiparous women, with normal, full-term infants, were interviewed during their first postpartum month. Approximately two-thirds of these mothers indicated that their infants' crying had been a major area of concern to them. The emotional feelings reported by the mothers ranged from irritation to frustration to anger and are indicative of the powerful effect of infant crying on the caregiver. Thirty-one of the mothers said that they responded to their infants' crying by picking up and holding them, a finding similar to that reported in Bell and Ainsworth's (1972) study. Other

interventions were reported to be used by the mothers such as, sucking, feeding, auditory and visual stimulation. However, the mothers' perceptions of the effectiveness of different soothing interventions was not discussed.

Dunn (1984), also investigated the maternal response to infant crying during the first postpartum month and reported findings similar to those of Harris (1979). Nine of the 19 primiparous women who were interviewed, rated their infants' crying as a concern to them at some time during the first postpartum month. Emotional responses reported by the mothers ranged from exasperation to frustration to helplessness. Picking up and holding the infant were the most frequent soothing actions reported. The mothers in Dunn's study reported that they were unable to evaluate the effectiveness of a particular soothing intervention since multiple interventions were used at one time. However, the data collected were retrospective and the mothers may have had difficulty recalling this information over the four-week period.

Entwisle and Doering (1981), as part of a detailed longitudinal study of 120 primiparous parents, investigated both the behavioral and the emotional responses of mothers to their infants' crying. Reports showed that 18% of the mothers let their baby cry occasionally and 43% let the baby cry regularly. Twenty-one percent reported feeling negative

emotions, such as anger. Another 21% reported ambivalent feelings: some concern, but also some negative feelings. Thirty-five percent reported mild or strong concern and 23% reported they were not bothered by the crying. Furthermore, this study reported a rather consistent relationship between the mother's feelings and her actions. For example, no one reported letting the baby cry while feeling great solicitude, and when women's actions and feelings were inconsistent they acted more solicitously than they felt. Breast-feeding and bottle feeding mothers were reported to differ in their reactions to their infants crying. Bottle-feeders were much more likely to let the baby cry regularly. Fifty-nine percent of bottle-feeding mothers reacted neutrally or negatively to the baby's cry, as compared to 36% of all breast-feeding mothers.

Mothers' Perceptions and Expectations of Their Infants

Snyder, Eyres and Barnard (1979) found that a mother's expectations of her infant's capabilities are related to the quality of the early environment that she provides and to the infant's development. Findings of their study of 193 primiparous women during the antenatal period, indicate that mothers with the least accurate expectations of their newborns are those with the lowest level of education,

income and psychosocial assets. Snyder et al. (1979) concluded that "people must be taught about the abilities of children if they are to encourage optimal development in their children from birth" (p. 357).

Broussard and Hartner (1970) reported that mothers' perceptions of their infants at one month of age were predictive of the childrens' subsequent emotional development. In a longitudinal study, 120 full-term, normal, first-born infants were followed from birth. These infants were categorized at one month of age into a High-Risk or Low-Risk group for possible problems in emotional development. The predictions were based on the mothers' responses to the Neonatal Perception Inventory (NPI) devised by Broussard. On the basis of this inventory, mothers who rated their infants as average or less than average were considered to have a negative perception of their infants. Thus, the infants were considered to be at risk for later problems. Analysis of data in this study indicated that there was a significant relationship between the mothers' early perceptions and the childrens' later emotional status. More infants in the High-Risk group needed therapeutic intervention at age 4 1/2 years than those in the Low-Risk group. Palsin (1980) attempted to replicate the findings reported by Broussard and Hartner (1970) with a sample of 50 children but was unable to demonstrate the predictive

validity for later emotional problems.

Snyder's (1976) report of Maternal Perception studies in the Washington Nursing Child Assessment Project showed a relationship between changes in the mothers' perception of their infants over the first postpartum month and the infants' temperament, among other problems. Fifty-nine (32%) out of 187 mothers completing Neonatal Perception Inventories showed changes in the perception of their infants over the one month period. In this subgroup of mothers who changed, 27 reported their infants to be better than they expected, whereas 32 mothers reported their babies to be less than they expected. Further analysis of data collected from these 32 mothers found that 19 of the babies were having some difficulty adapting to their environment. Seven (N=7) of those babies were described as being colicky and four (N=4) were described as fussy, irritable, grouchy and demanding. However, in five of the mother-infant pairs there was no concurrent clinical data which helped explain the negative perception. It can be implied from this study that the infant's negative behavior influenced the mother's perception of her infant but other factors such as the mother's confidence, previous experience, mother's personality, and family support may also influence her perception. These factors were not discussed in the report.

Nover, Shore, Timberlake and Greenspan (1984)

investigated the relationship of maternal perception and maternal behavior in a group of 43 white, middle class mothers and their healthy, full-term, first-born, nine month old infants. Reports indicated that when perception of infant behavior was not accurate, there was a direct association with the way mothers interacted with their infants. Mothers whose perceptions were distorted were less responsive and more interfering. Furthermore, mothers who tended to see their infant's behavior as below their expectations for the behavior of the average infant, tended to be less socially interactive and less effectively available to them. It is reasonable to assume that mother-infant relationship during the neonatal period may be similarly affected if the mother's perceptions of her infant are distorted. Leifer (1980), in her research on the psychological effects of motherhood, indicated that the way in which the new mother perceived her infant was critical in determining the intensity of emotional attachment. Mothers who saw their infants as being responsive to them, derived much satisfaction in their new role, whereas those who saw their infants as not especially responsive felt unrewarded. However, it was not always clear whether the infants were less responsive than others, or whether this was simply the mother's perception. Similar findings are reported by Kennedy (1973) who noted that the mother-newborn

relationship may be easily influenced in a negative way if the mother makes a faulty or negative assessment of the infant's attitude towards her. Inconsolable crying is one behavior, among others, that leads mothers to believe that their infants have a rejecting attitude toward them (Kennedy, 1973; Leifer, 1980). The mother's perceptions and expectations of her infant's crying are of particular importance in understanding how mothers respond to their infants' crying behavior. However, there is very little information in the literature on the relationship of infant crying and maternal perception.

Summary

The findings presented in this literature review indicate the significance of infant crying and the maternal responses to such crying. The infant cry has been studied in detail and is considered to have important signal value. As the infant's primary means of communication, the cry conveys information to the caregiver concerning the status and needs of the infant. The caregiver's perception and interpretation of those cries will determine if those needs are met appropriately. Although there are many reasons for neonatal crying quoted in the literature, there is not a general agreement on the cause of such crying. Research

conducted on the amount, frequency and duration of infant crying reveals varying results and no general agreement as to what is considered to be a normal amount of crying for the average, normal infant. Many interventions, used to console crying infants, are discussed in the literature but it is not known for certain how effective those interventions are, if and when they are used by mothers in the home environment.

Research investigating the adult response to infant crying has been conducted, for the most part, in laboratory settings and focuses on the adult's perception of different cry sounds and their physiological response to those cries. The results of those studies are assumed to be indicative of how adults behave as caregivers. Studies conducted in the home environment have mostly focused on the mother's motor response to the crying infant. Thus they provide no information as to how the mother's affective response may influence her ability to care for her infant. Research has also indicated that the maternal perception of the neonate plays an important role in the beginning mother-infant relationship and subsequent child development. However, very little is known as to how much the infant's crying behavior influences the mother's perception.

In conclusion, further investigation of the relationship between neonatal crying and maternal responses

is required in order to contribute to the understanding of this caregiving concern.

CHAPTER III

Methodology

Because of the scarcity of relevant research on the topic, an exploratory descriptive design was selected for this study. A structured diary designed by the investigator, was used to collect data on primiparous mothers' responses to their infants' crying during the third postpartum week. The Neonatal Perception Inventories (NPI) were used to measure the mothers' expectations and perceptions of their infants' crying during the immediate postpartum period in hospital and again at home, approximately four weeks postpartum. A Background Data Sheet was used to collect demographic and other relevant data from the mothers' medical charts.

Sample

The sample consisted of 40 healthy primiparous mothers who delivered healthy, full-term infants at the selected hospital during the data collection period. Mothers and/or infants experiencing any postnatal complications that would interfere with the mother's routine infant caretaking responsibilities were excluded from the study population. The following criteria were used for sample selection:

1. Mothers
   - first time mothers, vaginal or cesarean delivery.
   - married or having a common law relationship.
   - between 18 and 38 years of age.
   - understand, speak and read English.
   - live in a geographical area accessible to the investigator (Metropolitan St. John's).
   - no postpartum complication, i.e. postpartum hemorrhage, infection, severe depression or postpartum psychosis.
2. Infants
   - healthy full-term (38-42 weeks gestation)
   - normal Apgar score of 8 or > 8 at 5 mins.
   - product of a singleton pregnancy.
   - no congenital anomalies detected at birth or during the first month of life.

Of 462 women delivered at the selected hospital during the twelve week data collection period, 148 (32%) were primiparas. Sixty-five (43.9%) of these primiparas met the selection criteria and were approached by an intermediary nurse. Ten of these mothers refused to participate in the study for the following reasons: not interested (N=5), moving house (N=1), planing to stay with their mother who lived in a geographical area not accessible to the

investigator (N=2), and moving residence outside the Province (N=2). Of the remaining 55 mothers participating in the study, seven withdrew at a later date for the following reasons: too busy (N=3), maternal illness (N=2), exhausted from walking the floor at night with crying infant (N=1), and moved out of town to stay with mother (N=1). One mother was excluded from the study when she was unable to be contacted by the investigator at diary collection time. This left a total of 47 mothers who agreed to complete the study. Of the 47 mothers who completed the research instruments, 7 did not fully complete the diary. Therefore, these 7 subjects were exlcuded from the data analysis. This left a sample of 40 mothers.

The Setting

Data collection was carried out in two settings: the hospital and the mother's home. The hospital setting was the mother's room or ward in a 32 bed, family-centered, combined care, postpartum unit in a local, university-affiliated, teaching hospital. Twenty-four hour rooming-in was available but not compulsory. Parent teaching was an ongoing responsibility of all nurses caring for mothers and babies in the postpartum unit. Educational television, group and individual teaching was provided on topics such

as self-care, infant care and feeding. Fathers were encouraged to attend the hospital teaching sessions, if they wished to do so. All mothers were referred to the Public Health Nurse for home follow-up visits. An outpatient breast feeding clinic was available once a week. The home setting consisted of privately-owned homes or rented apartments. One of the mothers lived in an apartment building.

Data Collection Instruments

The Diary

A search of the literature failed to find a suitable instrument to collect prospective data on neonatal crying and the mother's responses to such crying. Therefore, a structured diary was developed by the investigator. The design of the diary was based upon knowledge obtained from the literature and upon feedback from the mothers who used the diary during the pilot study. Selection of the diary content was based upon the literature review, the investigator's clinical experience and consultation with experts both in content and in questionnaire design.

The diary was constructed of 10 sheets. The first two sheets contained the instructions for the process of recording in the diary (Appendix A). The following seven

sheets, one for each day of the week, have been structured in identical fashion (see Appendix B for a sample sheet). At the top of each sheet there was a 24-hour record on which the mothers were asked to record the episodes of crying, feeding and sleeping activities of their infants. The purpose of this record was to provide an indication of the episodes of infant crying within a 24-hour period and the presence or absence of a pattern of neonatal crying. The remainder of each daily sheet contained closed and open-ended questions to elicit information from the mothers, concerning their perception of the causes for their infant's crying, actions taken to soothe their infants and the effectiveness of these actions. Questions pertaining to advice concerning infant crying were also included. The last sheet of the diary contained questions to obtain data on certain factors which may influence the mother's response to her infant's crying (Appendix C).

Colleagues in the fields of maternal-child nursing, nursing education and clinical practice who were experienced in questionnaire construction reviewed the questionnaire items in the diary and offered suggestions for revision. The diary was pre-tested by four primiparous women in their homes, during their first four to six weeks postpartum. These mothers did not find the use of the diary to be time consuming or difficult. They found the diary content to be

relevant and of interest to them. The mothers suggested that it may be more convenient if the twenty-four hour record of the infants' crying, feeding and sleeping was on the same page as the questions pertaining to the crying. The diary was modified following this suggestion.

Diaries have been commonly used by other researchers to study infant crying behaviour ((Bernal, 1972; Brazelton 1962; Kirkland 1985; Hunziker & Barr, 1986) and have been reported to provide valid and useful reports of infant crying over a short term period (Barr, Kramer, Boisjoly, McVey-White & Pless, 1988). Kosa, Alpert and Haggerty (1967) studied the reliability of health diaries in the collection of family health information, and reported them to be more efficient then retrospective health interviews. The diary method was considered appropriate for this study since it minimized the problem of factual recall and, although structured, permited freedom of expression (Freer, 1980). The mothers in this study were informed by the investigator that they could write on the back of the daily diary sheet, if they wished to express themselves further concerning any of the items in the diary. The reliability of the diary used in this study was based upon the mothers' accuracy of recording and their assiduous completion of the records on a 24-hour basis, as requested for the seven days. No attempt was made to verify the accuracy of these

recordings.

The Neonatal Perception Inventories

The Neonatal Perception Inventories (NPI) developed by Broussard (1979) were designed to measure the mother's perception of the infant as compared to her concept of the average infant, and to provide a measure of the adaptive potential of the mother-infant unit during the first month of life. The instrument consists of two distinct inventories, the Neonatal Perception Inventory I and the Neonatal Perception Inventory II (Appendix D). Each inventory consists of two forms designed to be used together: the "Average Baby" and "Your Baby" forms. Each of these forms consists of six single-item scales; crying, spitting, feeding, elimination, sleeping and predictability. The NPI I was to be administered during the immediate postpartum hospital stay (days 1-4) and the NPI II approximately 1 month postpartum (4-6 weeks). Mothers are asked to rate the average infant and their own infant in terms of how much difficulty they perceive in the above six behavioral areas. Ratings are made from "none" (1) to "a great deal" (5). The ratings on each scale are added separately and the total score from "Your Baby" scale is then subtracted from the total score of the "Average Baby" scale to give a perception score. Mothers obtaining a score

of zero or a negative number (rating own baby not better than average) are considered to have a negative perception. A score of +1 or greater (rating own baby better than average) is considered a positive perception (Broussard, 1979). Broussard and Hartner (1971) stated that both the NPI I and NPI II have construct and criterion validity. However, they did not provide specific information to support these conclusions. The Neonatal Inventories were used in this study to identify the mothers' expectations and perceptions of their neonates' crying behavior. Permission to use the Neonatal Perception Inventories in this study was obtained from Broussard (Appendix E). The Inventories were administered and scored according to the guidelines prepared by Broussard (Appendix F).

Background Data Sheet

This data sheet (Appendix G) was used to collect demographic and perinatal data from the mothers' medical charts. The selection of this data was based on information in the literature concerning maternal and neonatal variables associated with the maternal response to infant crying.

Data Collection Procedure

Data were collected in the hospital setting over a twelve week period, from March to mid-May. Each day until 55 subjects were recruited, an intermediary (a Registered Nurse working in the unit), distributed a letter of explanation (Appendix H) to those mothers who met the selection criteria and obtained verbal consent from the mothers to be interviewed by the investigator. The Registered Nurse provided the investigator with the names of those mothers interested in participating in the study. The investigator then approached the selected mothers on their second or third postpartum day to arrange a mutually agreeable time for an interview. At this agreed-to time the investigator further explained the study, answered any questions posed by the mothers and asked the mothers to sign the informed consent form prior to data collection. The mothers then completed part I of the Neonatal Perception Inventory, and the researcher demonstrated and explained the use of the diary. The mothers were instructed to begin the diary record at the commencement of their third postpartum week and to complete it for 7 consecutive days. Each mother was given an envelope containing the diary, a pen, instructions for diary use and the name and phone number of the investigator. The hospital visit lasted approximately

20 minutes. The demographic and perinatal data were collected from the mother's medical chart, prior to the mother's discharge day and recorded on the background data sheet by the investigator. At the beginning of their third postpartum week, the mothers were telephoned by the investigator and reminded to begin the diary record. If necessary, at this time, instructions for the use of the diary were reviewed. The investigator telephoned the mothers again during the fourth week to schedule a home visit at the mother's convenience. During the home visit the mother completed part II of the Neonatal Perception Inventory. The researcher collected the diary and checked it for completeness. This data collection period was completed within a time range of ten minutes to one hour, depending on whether or not the mothers wished to discuss some of their concerns with the investigator.

Ethical Considerations

The study was conducted with the approval of the Human Investigations Committees at both Memorial University's School of Nursing and the Institution at which data collection took place. (See Appendix I for letter to Hospital). Letters were sent to the medical and nursing staff informing them of the study (Appendices J and K).

The investigator approached the selected mothers during the second or third postpartum day to explain the purpose and nature of the study and to obtain an informed written consent (Appendix H). At this time the mothers were clearly informed of their right to withdraw from the study at any time without jeopardizing the present or future care of themselves or their infants. The mothers were assured that the study would not involve any risks to themselves or their infants. In addition, it was explained that although there were no direct benefits to them for participating, the mothers may benefit from having the opportunity to discuss their concerns with an interested and well qualified nurse. Confidentiality was ensured in that all collected information was coded and reported in such a way that identification of participants was not possible. Original data in the form of questionnaires and diaries were held in strict confidence and were destroyed when analysis was completed. The mother's privacy was ensured during the hospital interview which was conducted at a mutually agreeable time. The home visits were done at the mother's convenience during the fourth week.

Statistical Analysis

Analysis was performed using the Statistical Package for the Social Sciences (SPSSx). The quantitative data from mother's medical charts, the diary and the Neonatal Perception Inventory were summarized using measures of central tendency and frequency distribution. The results of the diary data were also analyzed by the use of inferential statistics such as, t-test, one-way analysis of variance and Spearman's rho correlation coefficients.

CHAPTER IV

Results

The findings of this study will be presented in three major sections. The first section contains a description of the demographic and perinatal characteristics of the study population. The second section contains information obtained from the mothers' diary records in relation to the following: a) neonatal crying episodes; b) causes for neonatal crying; c) the maternal feelings evoked by neonatal crying; d) neonatal crying as a source of maternal worry; e) the interventions used by mothers to soothe their neonates; f) the effectiveness of soothing interventions as perceived by the mothers; g) the advice that mothers received regarding the management of neonatal crying; h) sources providing infant crying information to mothers; and i) neonatal concerns other than crying. The third and last section contains the mothers expectations and perceptions of their infants' crying behavior as measured by the Neonatal Perception Inventories.

Characteristics of the Study Population

Demographic Characteristics

The study population consisted of 40 primiparous women.

The ages of those women ranged from 17 to 36 years, with a mean age of 26.38 years. Thirty-five of the women were married and 5 had a common-law relationship. Thirty-eight of the women were born in Canada. The 2 women born elsewhere had lived in Canada for at least 5 years. Examination of cultural background showed that 37 of the 40 women were of North American origin, 2 were of Asian descent (Chinese) and 1 was from a Caribbean Island. All of the 40 women had completed high school. Twelve of the women had completed a University Degree and 14 had completed a diploma from technical college or its equivalent. Table 1 is a summary of the demographic characteristics.

Perinatal Characteristics

The participants delivered healthy, full-time infants, of which 17 were male and 23 were female. The lengths of their labor ranged between 3 and 19 hours with a mean length of 8.66 hours. Twenty labors were induced, all of which included both artificial rupture of membranes (ARM) and oxytocin drip. Seventeen of the 40 labors ended in spontaneous deliveries. Fourteen of the 40 labors were assisted with low forceps and 9 had to be delivered by cesarean section. Six of the 9 women delivered by cesarean section received a general anesthetic and 3 received an epidural anesthetic. Of the 31 vaginal deliveries, 29 women

Table 1

Demographic Characteristics of the Population (N=40)

Characteristic	Frequency	Valid Percent	Cumulative Percent
Age			
17-20 years	4	10.0	10.0
22-25 years	14	35.0	45.0
26-30 years	16	40.0	85.0
30-36 years	6	15.0	100.0
Marital Status			
Married	35	87.5	87.5
Common-law	5	12.5	100.0
Education			
High School	14	35.0	35.0
University Degree	12	30.0	65.0
Technical/Diploma	14	35.0	100.0
Place of Birth			
Canada	38	95.0	95.0
Singapore	1	2.5	97.1
Jamaica	1	2.5	100.0
Ethnic Background			
North American	37	92.5	92.5
Asian	2	5.0	97.5
Caribbean	1	2.5	100.0

received local anesthetic, and two received an epidural anesthetic. Twenty-nine of the 47 women received analgesics during labor, 11 did not receive any analgesia.

Twenty-four (60.0%) of the women breast-fed their infant in hospital and 16 (40.0%) bottle-fed their infants. Four of the breast-feeding mothers changed to bottle-feeding during the first two weeks at home. Two of those had to discontinue breast-feeding because of health problems, one felt that the baby was not satisfied and one stated she did not have enough milk.

All but 2 of the 40 women were rooming-in with their infants during their hospitalization. Rooming in was available on a 24-hour basis. However most of the women kept their babies during the day and evening but returned them to the nursery for the night. The two women who decided against rooming-in were delivered by cesarean section under a general anesthetic.

Twenty-nine (72.5%) of the 47 women attended prenatal classes and 11 (27.5%) did not. Only 14 (35.0%) of the 40 women in the study had previous experience with neonates and 26 (65.0%) had none or very little experience. The majority of the 14 women who had previous experience received this experience from babysitting younger siblings in their family or those of their friends. Table 2 is a summary of the perinatal characteristics of the study group.

Table 2

Perinatal Characteristics of the Population (N=40)

Characteristic	Frequency	Valid Percent	Cumulative Percent
Attendance at prenatal class			
Yes	29	72.5	72.5
No	11	27.5	100.0
Infant rooming-in			
Yes	38	95.0	95.0
No	2	5.0	100.0
Method of Infant Feeding (Hospital)			
Breast	24	60.0	60.0
Bottle	16	40.0	100.0
Method of Infant Feeding (Home)			
Breast	20	50.0	50.0
Bottle	20	50.0	100.0
Method of Delivery			
Normal Spontaneous	17	42.5	42.5
Forceps assisted	14	35.0	77.5
Cesarean	9	22.5	100.0
Length of Labour			
Less than 12 hours	30	75.0	75.0
12 hours or greater	10	25.0	100.0

(table continues)

Characteristic	Frequency	Valid Percent	Cumulative Percent
Induction of Labor			
Yes	20	50.0	50.0
No	20	50.0	100.0
Type of Induction			
Arm	1	2.5	2.5
Oxytocin	2	5.0	7.5
Both	17	42.5	50.0
N/A	20	50.0	100.0
Type of Anesthesia			
Local	29	72.5	72.5
Epidural	5	12.5	85.0
General	6	15.0	100.0
Analgesia during labor			
Yes	29	72.5	72.5
No	11	27.5	100.0
Newborn gender			
Male	17	42.5	42.5
Female	23	57.5	100.0
Previous experience with Neonates			
None	10	25.0	25.0
Very little	16	40.0	65.0
Fair amount	8	20.0	85.0
Great deal	6	15.0	100.0

Results of Diary Data

Neonatal Crying

The number of daily episodes of crying, as recorded by the mothers, ranged from 0 to 17 with a mean of 4.95 and a standard deviation of 3.26. Six of the 40 mothers (15%) recorded zero episodes of crying. Two of these six mothers recorded that their infants had no crying episodes on one day out of the seven, one mother recorded no crying on two days and three recorded no crying on four days of the week. Three of those mothers who recorded no crying were breast-feeders who reported that they usually picked up their infants and fed them as soon as the infants awoke, especially if the infants were showing behaviors that may lead to crying. These mothers identified actions such as moving about and making whining or grunting sounds, to be precrying activity and stated that they "never really gave the baby a chance to cry". One bottle-feeding mother who reported no crying on 4 out of 7 days, also reported that she always picked up her baby before she got the chance to cry.

The average daily episodes of crying ranged from a low of 0.43 to a high of 13.14 episodes per neonate. The neonates cried an average of 6.65 episodes per day. A comparison of the average episodes of crying among male and

female infants showed no statistical difference between the means of those two groups. Likewise a comparison of breast-fed and bottle-fed infants revealed no statistical difference in the episodes of crying in relation to the method of feed. The peak crying time for the group occurred between 1800 and 2400 hours (Table 3). Out of a total of 520 episodes recorded during this time period, 308 (59.2%) occurred between 1800 and 2100 hrs.

Table 3

Recorded Periodicity of Neonatal Crying During 7 Days

Periodicity of Neonatal Crying	Number of Times Recorded
Between 2400-0600 hours	355
Between 0600-1200 hours	467
Between 1200-1800 hours	496
Between 1800-2400 hours	520

The raw data showing the episodes of daily crying for the 7 day period are summarized in Table I, Appendix L.

Causes for neonatal crying.

The mothers as a group (N=40) identified 15 different causes for their infants' crying. Hunger was the most common cause attributed to neonatal crying by 39 of the 40 mothers in the study group. Gas pains was the second most common cause, recorded by 36 of the 40 mothers. Twenty of the 40 mothers recorded discomfort as a cause for the crying but did not specify the cause of the discomfort. Wet diaper was recorded many times as a cause for crying but only 15 mothers recorded it as an isolated cause. Table 4 contains a summary of all the causes for neonatal crying, as recorded by the mothers and the number of times each cause was recorded during the week.

Thirty of the mothers (75%) in the study related their infants crying to physical causes whereas only 10 (25%) related the crying to social reasons such as loneliness. The results show that all of the mothers felt that they knew the cause of their infants crying most of the time. Only 11 (27.5%) of the 40 mothers recorded that they did not know the cause of their infants crying at certain times.

Table 4

Causes for Neonatal Crying as Recorded by the Mothers and Number of Times Recorded During 7 Days

	Frequency (N=40)	Number of Times Recorded
Hunger	39	986
Gas pains	36	253
Restlessness	22	110
Hunger and Wet diaper	21	51
Discomfort	20	67
Wet diaper	15	38
Getting bath	11	24
Fatigue	11	37
Unknown	11	37
Loneliness	10	37
Gas pains and restlessness	4	24
Getting dressed	4	18
Diaper rash	2	11
Fatigue and restlessness	2	4
Need to suck	2	7
Put down in cot	2	2
Hiccups	1	1
Constipation	1	2
Frightened by noise	1	1
Diaper rash and wet	1	3
Hunger, restlessness and discomfort	1	1
Hunger, fatigue and wet diaper	1	7
Gas pains, discomfort and restlessness	1	21

Note: Some subjects recorded more than one cause for an episode of crying.

Maternal feelings evoked by neonatal crying.

Eight major types of feelings were recorded by the mothers in response to their infants crying. Affectionate feelings were most commonly recorded, followed by feelings of concern, frustration and worry. The majority of mothers reported a combination of feelings in response to their infants crying at any one particular time. Table 5 contain a summary of all the feelings recorded by the mothers and the number of times each of the feelings were recorded during the week. The feeling of affection was most commonly reported at feeding times. A combination of affectionate and negative feelings was recorded by 24 of the 40 mothers. One mother in the group recorded "affectionate" as her only emotional response. Reports indicated that mothers felt frustrated and worried when their infants continued to cry at a time when there was no obvious cause for the crying. Many mothers who recorded gas pains as a cause for their infants crying also recorded negative feelings, when they were unable to calm the infant. One breast-feeding mother who recorded that most of her infants crying episodes were due to gas pains also recorded feelings of frustration. She stated "as the day went on I became more and more frustrated, as nothing seemed to relieve the gas pains."

Table 5

Maternal Feelings Evoked by Neonatal Crying as Recorded by the Mothers and Number of Times Recorded During 7 Days

Feelings	Frequency (N=40)	Number of Times Recorded
Affectionate	33	778
Concerned	27	145
Frustrated	19	71
Worried	14	37
Affectionate & Concerned	12	130
Anxious	11	30
Bothered	9	42
Sad	5	12
Tired	4	1
Affectionate & Bothered	4	6
Frustrated & Bothered	4	10
Frustrated & Concerned	3	8
Frustrated & Worried	3	9
Concerned & Worried	3	5
Affectionate & Worried	3	3
Affectionate, Concerned and Worried	3	4
Affectionate, Concerned, Worried and Sad	3	7
Affectionate and Anxious	2	6
Affectionate and Sad	2	9
Affectionate, Concerned and Anxious	2	2
Affectionate, Concerned, Worried, Sad and Bothered	2	11
Frustrated and Tired	2	6
Worried and Sad	2	2
Affectionate and Tired	1	1

(table continues)

Feelings	Frequency (N=40)	Number of Times Recorded
Affectionate, Bothered and Sad	1	1
Affectionate, Frustrated, Sad and Worried	1	3
Frustrated, Worried and Concerned	1	6
Frustrated, Sad and Anxious	1	6
Frustrated, Worried and Anxious	1	2
Frustrated, Concerned and Sad	1	15
Concerned and Anxious	1	3
Anxious and Sad	1	2

Note: Some subjects recorded more than one feeling per episode of crying.

Neonatal crying as a source of maternal worry.

After completing the last day of the diary, the mothers rated how much infant crying had been a worry for them as either "not at all" (1), "very little" (2), "fair amount" (3), or "a great deal" (4). Results showed that only 2 of the 40 mothers (5%) were not worried at all, 22 (55%) worried very little, 14 (35%) worried a fair amount and only 2 (5%) worried a great deal. As a group there were 24 (60%) mothers who experienced no or very little worry whereas 16

(40%) experienced a fair amount or a great deal of worry. There was a statistically significant difference between the means of average daily crying episodes for those two groups (see Table 6). In the total group of 40 mothers there was a significant positive correlation between the average daily episodes of neonatal crying and the mothers worry ratings (r_s = .3715, P = .009). Individual scores of mothers' worry ratings are displayed in the last column of Table I, Appendix L.

Soothing Interventions Used by Mothers

The various soothing interventions used by the mothers are summarized under five categories as discussed in the literature; a) movement, b) promotion of sucking, c) auditory stimulation, d) motor restraint; and e) medication.

Table 6

T-Test for Differences in Mean Episodes of Neonatal Crying Between Group I (Mothers With Low Worry Ratings 1-2) and Group II (Mothers With High Worry Ratings 3-4) (N=40)

Group	Number of Cases	Mean	Standard Deviation	Standard Error	F Value	Separate T-Value	Variance Degrees of Freedom	Estimate 2-Tail Prob.
I	24	5.6230	3.310	0.676				
					1.32	-2.61	35.25	0.013*
II	16	8.1964	2.877	0.719				

*p < 0.05

Movement

Interventions involving movement made up the largest category of soothing responses (Table 7). The most common intervention in this category was rocking in arms. The majority of the 37 mothers who used this intervention had access to rocking chairs whereas others used rocking motions while holding the infant in their arms. Twenty-four of the 40 mothers recorded carrying the infant in their arms while they walked around the room.

Table 7

Interventions Involving Movement as Recorded by Mothers

Intervention	Frequency (N=40)
Rocking in arms	37
Carrying in arms	24
Stroller ride	7
Car ride	7
Automatic swing	3

Note: Subjects recorded more than one intervention

Only seven mothers recorded the use of a stroller ride or car ride as a soothing intervention. One of the mothers recorded the use of the stroller indoors only, whereas the other seven used the stroller to take the infant outside. Some of these seven mothers reported that the infant was very quiet during the stroller ride but it was difficult to settle the infant after coming back into the house. The mothers who recorded car rides as a soothing intervention did not deliberately use this technique. They had taken their infants with them while they ran errands and noticed how quickly the infant fell asleep. Three mothers recorded the use of an automatic swing. Those mothers stated that their infants were quiet as long as the swing was moving.

Promotion of Sucking

The promotion of sucking was the second largest category of soothing interventions recorded (Table 8). Thirty-nine of the forty mothers recorded feeding as a soothing intervention. This is not surprising, considering that these mothers recorded hunger as the major cause of their infants crying. Eight of the mothers fed their infants warm water or sugar water. This was usually done in an effort to soothe these infants suffering from gas pains. Thirty-four of the mothers recorded the use of pacifiers as a soothing intervention. Extra sucking time

at the breast was not recorded as a soothing intervention. Therefore it is not known how many breast-feeding mothers were able to differentiate between nutritive and non-nutritive sucking at the breast.

Table 8

Interventions Involving the Promotion of Sucking as Recorded by Mothers

Nutritive Sucking	Frequency (N=40)	Non-nutritive Sucking	Frequency (N=40)
Feeding	39	Pacifier	34
Sugar Water	5		
Warm Water	3		

Auditory Stimulation

Auditory stimulation in the form of talking, singing or playing music was recorded by the mothers as a soothing technique (Table 9). Many of the mothers stated that they talked and sang to their infants most of the time but they did not always record it as a soothing intervention. Only two of the mothers recorded using music as a soothing technique. One mother found this to have a calming effect on her baby during his bath. The music was usually provided by a wind up toy or mobile.

Table 9

Interventions Involving Auditory Stimulation as Recorded by Mothers

Intervention	Frequency (N=40)
Talk to baby	30
Sing to baby	22
Play music	2

Note: Subjects recorded more than one intervention

Motor Restraint

The literature refers to motor restraint as a soothing technique that involves holding the infant's arms and legs tightly against his body. This is usually accomplished by swaddling the infant. None of the mothers in this study recorded using this technique. As summarized in Table 10, one mother recorded the use of a snugly carrier which does restrain the infants limbs. Two mothers referred to cuddling their infants to their body as they lay in bed or on the sofa. However it cannot be assumed that those mothers used those techniques because of the benefits of motor restraint.

Table 10

Interventions Involving Motor Restraint as Recorded by Mothers

Intervention	Frequency (N=40)
Cuddle Baby	2
Carry in Snugly	1

Medication

None of the mothers reported the use of prescription drugs to soothe their infants. However 5 mothers recorded the use of over-the-counter medication for treatment of their infants' gas pains (Table 11). Two of these mothers reported that doctors had informed them that their infants may be colicky and these doctors suggested the use of ovol® drops.

Table 11

Use of Medication as Recorded by Mothers

Type of Medication	Frequency (N=40)
Gripe Water	4
Ovol® drops	1

There were some interventions recorded by the mothers that were difficult to place in any particular category. A summary of these miscellaneous soothing interventions are listed in Table 12.

Table 12

Miscellaneous Soothing Interventions as Recorded by Mothers

Intervention	Frequency (N=40)
Change diaper	14
Pat baby's back	4
Burp baby	3
Give bath	2
Put in cot	1
Sit up in car seat	1
Let cry	1
Rub baby's tummy	1
Put to shoulder	1

Fourteen of the mothers recorded the change of diapers as a soothing intervention. However there are too many factors involved in this procedure to be able to say it was the actual change of diaper that caused the infant to stop crying. Two of the forty mothers recorded the use of a bath during the evening to settle their infant for sleep. The one mother who recorded the use of a car seat reported that she placed the seat on the kitchen table. She did this

because the infant seemed to enjoy seeing what was going on around him. Only one mother recorded putting her infant in the cot and letting the infant cry. This was recorded only once during the week.

The mothers who recorded patting the baby's back, rubbing baby's tummy and putting the baby to her shoulder were all actions taken to relieve the infants' gas pains. One of these mothers wrote in her diary that when she patted the baby she also moved him around in order to "break up the gas".

Effectiveness of Interventions

Mothers in the study were asked to rate the effectiveness of each intervention used as either "not at all" (0), "somewhat" (1), or "very effective" (2). All of the forty mothers were able to rate most of the interventions they used. However, there were times when some mothers used a combination of interventions for single episodes of crying and were unable to evaluate the effectiveness of either one. Because of this problem, the results will show the effectiveness of only interventions that were rated when used.

The effectiveness of interventions involving movement are displayed in Table 13. The automatic swing was used by

Table 13

Effectiveness of Interventions Involving Movement

Type of Movement	Number of Mothers Using Intervention	Number of Times Used in 7 Days	Number of Times Rated	Ratings of Effectiveness		
				0 Not At All N(%)	1 Somewhat N(%)	2 Very N(%)
Rocking	37	279	155	1(0.64)	66(42.6)	88(56.8)
Carry	24	199	74	-	40(54.1)	34(45.9)
Stroller Ride	7	12	12	-	3(25.0)	9(75.0)
Car Ride	7	16	16	-	1(6.25)	15(93.8)
Swing	3	5	5	-	-	5(100.0)

Note: Some of the subjects reported using more than one intervention.

three mothers only but it was rated as very effective each time it was used. Car ride was used by seven mothers and was recorded as being very effective 93.8% of the times it was used. Rocking was the most frequently used intervention in the movement category. Thirty-seven (92.5%) of the 40 mothers rocked their infants in their arms and found it very effective 56.8% of the times, somewhat effective 42.6% of the time and not at all effective 0.64% of the times used.

Feeding the infant with formula or breast milk was the most frequently used intervention in the sucking category and the most effective (Table 14). The 39 mothers recorded feeding as very effective 98.7% of the times it was used. Mothers rated the use of the pacifier as being very effective 62.1% of the time and somewhat effective 31% of the time. These mothers who rated the pacifier as somewhat effective reported that their infant would only suck on the pacifier for a short time and then cry again.

Table 14

Effectiveness of Interventions Involving Sucking

Type of Sucking	Number of Mothers Using Intervention	Number of Times Used	Number of Times Rated	Ratings of Effectiveness		
				0 Not At All N(%)	1 Somewhat N(%)	2 Very N(%)
Nutritive						
Milk	39	1046	1045	4(0.38)	10(0.95)	1031(98.7)
Water	8	17	17	-	5(29.4)	12(70.5)
Non-Nutritive						
Pacifier	34	220	95	5(5.26)	31(32.6)	59(62.1)

The mothers who rated the pacifier as not at all effective reported that their infants refused to take the pacifier when it was offered to them. One breast feeding mother reported that her infant refused to substitute the pacifier for her breast. However the infant would take the pacifier when offered by her husband.

Auditory stimulation received low ratings of effectiveness by the mothers (see Table 15). As mentioned previously many mothers talked and sang to their infants at the same time as they rocked or carried them. Therefore it was difficult for them to rate the effectiveness of talking or singing to their infants. However of the 25 times rated, it was recorded as very effective only 8.0% of the time and somewhat effective 92% of the time. Singing was rated as somewhat effective on three occasions only even though it was recorded 27 times during the week. Music was reported by two mothers only, although it was recorded as being very effective each time it was used.

Advice Regarding Management of Neonatal Crying

Thirty-nine of the 40 mothers (97.5%) discussed their infants crying with another person during the week that they kept their diaries. The majority of mothers (N=35) discussed the topic with their husbands, whereas only six

Table 15

Effectiveness of Interventions Involving Auditory Stimulation

Type of Sound	Number of Mothers Using Intervention	Number of Times Used	Number of Times Rated	Ratings of Effectiveness		
				0 Not At All N(%)	1 Somewhat N(%)	2 Very N(%)
Talking	30	149	25	-	23(92.0)	2(8.0)
Singing	22	127	3	-	3(100.0)	-
Music	2	4	4	-	-	4(100.0)

(N=6) of the mothers discussed the topic with a nurse. Table 16 contains a summary of all the persons with whom the mothers discussed their infants' crying. Of the 39 mothers discussing the crying, 28 (71.8%) received advice concerning the management of infant crying. Fourteen (50%) of these mothers found the advice very helpful (see Table 17).

Table 16

Persons With Whom Mothers Discussed Their Infants Crying

Person	Frequency (N=40)	Percent
Husband	35	80.7
Mother	15	37.5
Friend	10	25.6
Doctor	6	15.4
Nurse	6	15.4
Sister	3	7.7
Mother-in-Law	2	5.0
Sister-in-Law	1	2.6
Nobody	1	2.5

Note: Some subjects discussed the crying with more than one person.

Table 17

Helpfulness of Advice as Recorded by Mothers

Rate of Helpfulness	Frequency N	(N=28) (%)
Very helpful	14	50.0
Slightly helpful	10	35.7
Not at all helpful	4	14.3

Four of the 6 mothers who discussed their infants' crying with a nurse received advice. One of those mothers recorded that she discussed the crying but did not request advice. Table 18 contains a summary of the advice given by these nurses and the helpfulness of this advice as rated by the mothers.

Six mothers discussed their infants' crying with a doctor during the week. Three of those women recorded the advice received as being very helpful, whereas the other three mothers recorded the advice as being slightly helpful (see Table 19).

Table 18

Advice Given by Nurses and the Helpfulness of this Advice as Recorded by Mothers

Type of Nurse	Type of Advice	Rate of Helpfulness
1) Public Health Nurse	Discussed how to deal with crying in relation to breast-feeding	Very helpful
2) Public Health Nurse	Discussed infants' fussy times	Slightly helpful
3) Nurse at Children's Hospital	Give sugar water to relieve gas	Slightly helpful
4) Public Health Nurse	Continue as usual	Slightly helpful

Table 19

Advice Given by Doctors and the Helpfulness of This Advice as Recorded by Mothers

Type of Doctor	Type of Advice	Rate of helpfulness
1) General Practitioner	Give ovol® drops to relieve gas	Slightly helpful
2) Doctor at Children's Hospital	Give ovol® drops. Continue to burp well	Slightly helpful
3) General Practitioner	Continue to comfort baby and give her water to relieve gas	Very helpful
4) General Practitioner	Feed small amounts of formula frequently	Very helpful
5) General Practitioner	Baby has thrush. Limit amount of sugar in formula	Very helpful
6) General Practitioner	Continue to nurse and rock baby	Slightly helpful

The two mothers who rated the doctor's advice as slightly helpful were told by the doctors that their infants may have colic. Two of the three mothers who found their doctors' advice as very helpful, had taken the infant to the doctors office. The doctor examined the infant and gave the mothers reassurance. One of the mothers was relieved to know that there was nothing physically wrong with her infant. The other mother was relieved to know that her infant's crying was due to a sore mouth for which she received medication.

As indicated in Table 16, mothers discussed their infants' crying with family or friends more often than with a doctor or nurse. Thirty-five of the 39 mothers (89.7%) discussed their infants' crying with their husbands however only eight of those received advice. Four of those eight mothers rated this advice as slightly helpful and four rated it as very helpful. Five of the 15 subjects who discussed crying with their mothers did not receive any advice. Of the 10 mothers who did receive advice, 5 rated it as very helpful, 3 rated it as slightly helpful, and 2 rated the advice as not at all helpful. The most frequent type of advice offered by family members and friends was that concerning feeding and gas pains. Table 20 contains a summary of the different types of advice offered by family members and friends, as recorded by the subjects.

Table 20

Types of Advice Offered to Mothers by Family Members and Friends

Advice Offered	Frequency (N=40)
Give water (plain, sugar or gripe)	10
Rock the baby	6
Give pacifier	3
Let baby cry for awhile	3
Cuddle and rock baby	1
Give the baby cereal	2
Give ovol® drops to relieve gas	1
Make sure you're feeding him enough	1
Let baby fuss	1
May have to bottle feed	1
Feed on demand	1
Burp more during feeds	1
Don't be tense	1
Carry in snugly	1
Sleep when baby sleeps during day	1
Consider going out more and leaving baby with others to soothe	1

Note: Some subjects received more than one type of advice from more than one person.

Sources Providing Information on Infant Crying

The mothers sources of information on infant crying are summarized in Table 21. The most frequently recorded source of information was books or pamphlets and the least recorded source of information was hospital postpartum classes. Four of the 40 mothers recorded that they did not receive any information on infant crying. Although books or pamphlets were the most frequent sources of information used by 27 mothers, only 8 of these mothers (29.6%) perceived them as very helpful in assisting them to manage their infants' crying.

Table 21

Sources Providing Information on Infant Crying and Number of Mothers Who Received Information

Source	Frequency (N=40) N	(%)
Books or Pamphlets	27	68.0
Prenatal Classes	18	45.0
Public Health Nurse	13	32.5
Hospital Nurse	6	15.0
Doctor	3	7.5
Hospital Postpartum Classes	1	2.5
None	4	10.0

Note: Some subjects recorded more than one source.

Table 22 contains a summary of the helpfulness of information as rated by the mothers who received it.

Table 22

Helpfulness of Information as Rated by Mothers

Source	Frequency (N=40)	Ratings of Helpfulness: Very helpful N (%)	Slightly helpful N (%)	Not at all helpful N (%)
Books or Pamphlets	27	8(29.6)	18(66.7)	1(3.7)
Prenatal Classes	18	5(27.8)	12(66.7)	1(5.6)
Public Health Nurse	13	6(50.0)	7(53.8)	-
Hospital Nurse	6	4(66.7)	2(33.3)	-
Doctor	3	1(33.3)	2(66.7)	-
Hospital Postpartum Classes	1	1(100.0)	-	-

Concerns Other than Neonatal Crying

Nineteen (47.5%) of the 40 mothers were concerned about other infant behavior besides crying. Of the eleven types of concerns recorded, spitting up was the most common concern recorded by 5 mothers. Three of these 5 mothers were breast-feeding and 2 were bottle-feeding. The two bottle-feeding mothers related the spitting up to gas whereas the three breast-feeding mothers questioned their nursing technique. Two of the four mothers who recorded vomiting as a concern stated that their infants drank their formula too fast. One mother who had switched from breast to bottle-feeding, blamed the infant formula for making her infant vomit. She changed to another formula and had no further problem. Four of the mothers were concerned about the infant's umbilicus. Two of these mothers detected the presence of an odour and were concerned about a possible infection in the umbilical area. One mother stated that after the cord fell off, burping the baby was difficult. Another mother was concerned because of the presence of blood when the cord fell off.

Of the three mothers who were concerned about their infants' sleeping habits, two were breast-feeders who recorded that their infants were waking up more often during the night to be fed. They wondered if this was caused by

the infants' growth spurts. Two mothers recorded bowel movements as a concern. One stated that the baby appeared to be troubled while trying to have a bowel movement. The other mother was concerned because her baby had gone two days without a bowel movement. A summary of all the concerns recorded by the 19 mothers is given in Table 23.

Table 23

Concerns Other Than Crying Recorded by Mothers During 7 Days

Type of Concern	Frequency (N=40)
Spitting up	5
Vomiting	4
Cord Care	4
Sleeping less	3
Rash	3
Gas	2
Bowel movements	2
Nasal congestion	2
Eye irritation	1
Ingrown fingernail	1
Sore mouth (thrush)	1

Note: Some subjects recorded more than one concern.

Mothers Expectations and Perceptions of Their Infants Crying Behavior

Forty mothers completed the Neonatal Perception Inventories I and II. The results are listed in Table 24.

Table 24

Mothers' Postpartum Perceptions of Their Infant's Behavior as Compared With That of an Average Infant (N=40)

Perception	Day 3 N (%)	Week 4 N (%)
Better than average	24(60.0)	32(80.0)
Average	10(25.0)	2 (5.0)
Less than average	6(15.0)	6(15.0)

Analysis of individual scores revealed that 17 mothers (42.5%) changed their perceptions from the time of birth to one month postpartum. Five of these 17 mothers (29.4%) changed their perceptions of their infants from "better than the average" infant to "average" or "less than the average" infant. This means they changed from a positive to a negative perception. A closer analysis of data revealed that three of these five mothers stopped breast-feeding during the first two weeks at home. Two of these three

mothers interpreted their infants crying to be related to their lack of breast milk. The other mother discontinued breast-feeding because of ill health. The two bottle-feeding mothers recorded difficulties with feeding, such as spitting up and vomiting. Since all five mothers and infants had problems adjusting to each other it is not surprising that the mothers' perceptions changed from positive to negative by one month.

Of the six individual items rated on the Neonatal Perception Inventories, crying scores are of particular interest to this study. The mothers' perceptions of their infants' crying as compared with that of the average infant's crying on the third day and fourth postpartum week are summarized in Table 25. These results reveal that on the third day postpartum, 18 mothers (45.0%) predicted their infants' crying to be less trouble than that of the average infant and 22 (55.0%) predicted the crying to be the same or more trouble. By the fourth postpartum week 26 mothers (65.0%) perceived their infants' crying to be less trouble than that of the average infant, whereas 14 (35.0%) perceived the crying to be the same or more trouble.

Table 25

Mothers' Postpartum Perceptions of Their Infants' Crying as Compared With the Crying of the Average Infant (N=40)

Perception	Day 3 N(%)	Week 4 N(%)
More trouble	2 (5.0)	4 (10.0)
Less trouble	18(45.0)	26(65.0)
Same trouble	20(50.0)	10(25.0)

Analysis of the individual crying scores revealed that 21 mothers (57.5%) perceived their infants' crying at four weeks postpartum to be different from that which they had predicted at three days postpartum. Seven of these mothers (33.3%) underestimated the amount of their infants' crying, whereas 14 (66.6%) overestimated the amount of crying they thought their infants would do. Further analysis of diary data revealed that mothers who were worried about their infants' crying and those who were not worried, differed in their perception of their infants' crying behavior during the fourth week postpartum (see Table 26). Of the 24 mothers who had little or no worry, 2 (8.3%) perceived their infants' crying as the same or more trouble than the average infant. In comparison 6 of the 16 mothers (37.5%) who

worried a fair amount or great deal, perceived there infants' crying to be the same or more trouble. Furthermore, there was a positive and significant correlation between high worry scores and negative perception of the infant at 4 weeks postpartum (r_s = .3704, P = .005).

Table 26

Worried and Non-Worried Mothers Postpartum Perceptions of Their Infants Crying as Compared With That of the Average Infant During Week 4 (N=40)

Perception	Non-Worried Mothers (N=24) N(%)	Worried Mothers (N=16) N(%)
More trouble	1(4.2)	5(31.2)
Less trouble	22(91.6)	10(62.5)
Same trouble	1(4.2)	1(6.3)

CHAPTER V

Discussion of the Results

The results of this study will be discussed under four main headings: (a) the causes mothers attributed to their neonates' crying behavior; (b) the maternal responses to neonatal crying; (c) neonatal crying as a source of maternal worry; (d) factors which may affect the mothers' responses to their neonates' crying; and (e) the summary.

The Causes Mothers Attributed to Their Neonates' Crying Behavior

Results of diary records indicate that all of the mothers in this study were able to attribute causes to their infants' crying most of the time. The literature considers the causes of infant crying to be of a physical and social nature (Bell, 1977; Bowlby, 1969; Brazelton, 1962; Dunn, 1977; Emde, Gaensbauer & Harmon, 1976; Illingworth, 1979; Jolly, 1985; Rheingold, 1969; Valman, 1980; Wolff, 1969), however the majority of mothers in this study attributed their neonates crying to physical causes (see Table 4). This finding may indicate that as new mothers are learning to interpret the meaning of their infants' cries, they may find it easier to identify physical causes rather than

social causes since the former is more obvious. It is also possible that some of the mothers lack knowledge about the social nature of infant crying and the role it plays in the mother-infant interaction process.

Hunger was the most common cause attributed to neonatal crying, by the mothers in this study. This finding is similar to that reported by other researchers (Dunn, 1984; Harris, 1978; Wolff, 1969). The infants' quieting response to feeding indicated that the majority of mothers in this study had correctly interpreted their infants' hunger cries and responded appropriately. However, a few infants were not always soothed by feeding (see Table 14). This finding was reported by both breast-feeding and bottle-feeding mothers but was more frequently reported by the former. This is not surprising since inexperienced breast-feeding mothers may wrongly attribute their infants crying to hunger when in fact their infants may have only wanted to fulfill their non-nutritive sucking needs or perhaps they were crying for the comfort of their mothers' body contact.

The high incidence of infants in this study suffering from gas pains is remarkable. Gas pain was attributed as a cause of neonatal crying at various times throughout the 24-hour period but was most frequently reported to be the cause of crying during the group's peak crying time, between 1800 and 2400 hours. This finding is interesting in that

other researchers have reported a similar peak crying time (Bernal, 1972; Harris, 1978; Illingworth, 1954; Smith, 1981) but were unable to attribute a definite cause to evening crying. Various factors have been suggested as a cause for evening crying such as colic (Illingworth, 1979), mothers' tiredness (Smith, 1981) and tension in the environment (Brazelton, 1962). However, none of these causes were recorded by the mothers in this study. The mothers who recorded gas pain as a cause of their neonates crying also recorded feelings of worry, frustration, and anxiety as they tried in vain to console their infants. This finding suggests that the infants' inconsolable crying may be attributed to the mothers emotional state rather than to gas pains. Newton (1983) suggests that infants will sense and respond to the emotional state of the parent. If the parent is tense and anxious when responding to the crying infant, the child may continue to cry. This causes the parent to become more tense and anxious creating a vicious cycle.

Primiparous mothers' interpretations of their infants crying may be influenced by many factors such as previous experience with the care of neonates, information obtained from health care workers, books, family and friends, and the mothers' perceptions of the cry sounds. The mothers' perceptions of their neonates cry sounds were not examined in this study. Therefore it is not known for certain if any

of the mothers could determine the cry-evoking situation from the acoustic characteristics of their neonates' cries. However, the mothers' diary data in this study seem to indicate that the mothers relied upon other factors such as what time the infant was last fed, the satisfaction of the infant after the feeds and the time of crying. For example, if their infants were still crying, even though they were just fed and changed, mothers considered the crying to be caused by gas pains, restlessness or some other physical discomfort. This finding supports those of Bernal (1972) who reported that the response to crying, by the majority of mothers in her study, depended on such factors as the time since the last feed or how well the feed had gone.

The Maternal Responses to Neonatal Crying

Behavioral Response

The majority of mothers in this study responded to their infants' crying most often by picking them up and implementing some form of soothing intervention. This finding is not surprising considering that infant crying is reported to be very effective in eliciting caregiving behavior (Ainsworth, 1969; Bowlby, 1969). The most frequent soothing interventions recorded in this study were feeding, rocking and carrying the infant. Results indicate that next

to feeding, interventions involving some form of movement were most effective in soothing crying infants. This finding supports that of Ames, Khazaie, Gavel and Farrell, (1984). Although car rides and automatic swings were rated by the mothers as very effective soothers, very few mothers reported using them. This finding may indicate that mothers may be lacking in knowledge concerning the effectiveness and/or appropriateness of these interventions as neonatal soothing techniques. It may also be possible that cars and commercial products such as swings may be inaccessible to some mothers due to their expense.

Rocking was the most frequently used intervention in the movement category. However, not all of the mothers rated it as a very effective soother. Research suggests that the type of rocking movement and the direction of the movement influences the soothing effects of rocking (Ambrose, 1969; Byrne & Horowitz, 1981; TerVrught & Pederson, 1973). Unfortunately data were not collected on the type of rocking used by mothers in the present study. Many mothers carried their infants in their arms to soothe them, but this intervention was rated most often as only being somewhat effective. Perhaps the position in which the infants were held (horizontal or vertical) may have influenced the effectiveness of the intervention. Korner and Thoman (1972) found that body contact had a significant

effect in calming infants but it was not as effective as the vestibular-proprioceptive stimulation entailed in being picked up and held in the upright position.

The pacifier has been discussed in the literature as an effective soothing intervention (Anderson, 1983; Darbyshire, 1985; Spock, 1977; Valman, 1980; Wolff, 1969) and received support in this study by both breast-feeding and bottle-feeding mothers. However many mothers offered the pacifier at the same time as they carried, rocked and sang to their infants and therefore were not able to rate the effectiveness of the pacifier alone. However use of these combined interventions were reported to be very effective at times, which supports Brackbills' (1971) findings that the more modalities used simultaneously the more effective the soothing.

Mothers' reports of the effectiveness of talking or singing to their infants supports the findings of Wolff (1969) who reported the quieting effects of the human voice as a soother and Thoman, Korner and William's (1977) findings that the human voice can be an effective soother when combined with other interventions. The very few mothers using music as a soothing intervention may indicate that mothers are unaware of its soothing effects on infants, despite the fact that many infants' mobiles and toys play musical sounds.

None of the mothers recorded using motor restraints such as swaddling. Mothers may not be familiar with the technique or may not consider it to be appropriate for their infants. Only one mother recorded the use of a snugly and reported it to be very effective. Mothers with crying infants may benefit from the use of a snugly, since it allows the mother to carry the infant while preparing a meal or doing light housework. The snugly may be an effective soothing intervention because it provides the infant with the combined benefits of motor restraint, body contact and movement while being held in the upright position.

None of the mothers reported the use of visual stimulation as a soothing response. Several factors may be considered as a reason why this type of intervention was not recorded by the mothers. Mothers may routinely place toys or mobiles in their infants' view most of the time and therefore would not necessarily refer to this action as a soothing intervention. The fact that the infants are receiving visual stimulation at the same time as they are being held and carried may prevent mothers from recording it as a single isolated soothing intervention. For example, one mother in this study referred to her infants' enjoyment of being able to see the action going on around him (see page 69). However, it is not certain that visual stimulation was the primary purpose of her soothing

intervention at that particular time.

Results indicated that the majority of mothers in this study responded to all of their infants cries no matter what time of the day, evening or night. In comparing breast-feeding and bottle-feeding mothers, the above response was the same and the types of interventions used were the same. Mothers, in this study, reported some interventions to be more effective than others. However, there is not enough evidence in this study to make any conclusions as why certain interventions were more effective. As indicated by the conceptual framework for this study, " the behavior of the infant after the intervention will indicate the effectiveness of the mothers' response" (p. 7). The diary data in this study reveals that the mothers' responses were not always effective in soothing their infants but no conclusions can be reached as to whether this was due to the mothers' soothing abilities or the infants' characteristics.

Emotional Response

Analysis of the mothers' diary data revealed that all but one of the mothers experienced various emotional feelings in response to their infants' crying. The finding in the study that affection was the most commonly expressed feeling seems unusual considering other researchers' reports that the infant cry is an aversive stimulus to mothers

(Frodi, 1981; Frodi, Lamb, Leavitt & Donavan, 1978). The affectionate feelings recorded by the mothers in this study were mostly in response to cries that the mothers attributed to hunger. Since hunger was the most common cause attributed to crying, this would account for the high number of affectionate feelings recorded. Feeding was also recorded by the majority of mothers (see Table 14) to be a very effective soothing intervention. Thus it may be assumed that the infants were satisfied with their feedings and that the mothers interpreted their infants' behavior as positive feedback for their efforts. The fact that feeding time was a pleasant situation for most mothers would explain the finding of affectionate feelings in response to the hunger cries. However, affectionate feelings were also expressed in combination with negative feelings such as worry anxiety, bother and frustration (see Table 5). These combined feelings were recorded in response to crying that was attributed to gas pains, and other forms of discomfort. It is possible that these mothers were experiencing ambivalent feelings, a finding similar to that reported by Entwisle and Doering (1981). On the other hand, the mothers in this study may have wanted to relay the message that they were still affectionate toward their infants, despite the negative feelings. All except one mother expressed negative feelings at various times throughout the week when they were

unable to soothe their infants crying. Negative feelings were commonly experienced in response to infant crying which was attributed to gas pains. This is to be expected considering that these infants were difficult to soothe and cried more frequently in the evening, a time when most mothers are tired and need to relax.

The emotional responses recorded by the mothers in this study are similar to those reported by Dunn (1984) and Harris (1978). However, none of the mothers expressed strong negative feelings such as anger and hostility that were reported by Harris (1978). It is possible that the mothers in this study were reluctant to record feelings that may not be socially acceptable. On the other hand, the mothers may have been influenced by the list of feelings in the structural diary. Despite the fact that mothers were encouraged to list feelings other than those already written in the diary (see Appendix A), mothers may have declined to do so because of difficulty in expressing how they felt at certain times.

The diary data in this study revealed a consistent relationship between the mothers' feelings and actions in response to their infants' crying. The majority of mothers responded by holding their infants and trying to soothe them, regardless of the type of feelings that the mothers were experiencing at the time. As stated earlier, few of

the mothers attributed social causes to their infants' crying. Therefore it can not be assumed that the mothers who picked up their crying neonates for reasons other than feeding or changing did so for the purpose of meeting the psychosocial needs of their infants. The mothers may have routinely picked up their infants as a means to stop the crying. This finding seems to support Moss' (1967) suggestion that the infants' crying is such a noxious stimulus that mothers respond not only out of concern for the infant but also to terminate the cry for their own comfort.

Neonatal Crying as a Source of Maternal Worry

Results revealed that mothers who reported that infant crying was a worry for them also recorded significantly more crying episodes than those who reported their infant crying as little or no worry. However, there were a few mothers who recorded the same amount of crying but rated their amount of worry differently (Appendix L). This finding suggests that other factors such as the length of the individual crying episodes, the perceived cause of the crying, the infant's response to soothing interventions and the mother's personality may have influenced the mother's worry ratings. The mother's age, education and previous

experience were examined as possible factors influencing the mothers' worry ratings. One-way analysis of variance revealed that these demographic factors were not related to the amount of worry. Further analysis of diary data indicated that of the 16 women who worried about their infants crying, 10 (68.7%) also had concerns about other infant behavior whereas only 9 of the 24 mothers (38.5%) with little or no worry had other concerns. Furthermore, there was a significant positive correlation between the mothers worry scores and concern scores (r_s=.3061, P=.018). Mothers who were worried about infant crying also had concerns about other infant behavior. This finding suggests that these other concerns may have attributed to the mothers worry about their infants' crying.

Factors Which May Affect the Mothers' Responses to Their Neonates Crying

The structural diary contained questions which were intended to elicit information from the mothers in an attempt to identify factors which may have influenced the mothers' responses to their neonates' crying. These factors are: advice received by mothers; resources providing information; and the mothers' perceptions of the helpfulness of this advice and information. The mothers' perceptions

of their neonates' behavior were also measured by the Neonatal Perception Inventories and the results will be discussed in relation to the mothers' responses to their infants' crying.

Advice Regarding Management of Neonatal Crying

The majority of mothers (N=35) in this study discussed their infants' crying with their husbands but only eight of these mothers received advice from their husbands as to how to manage the crying. Furthermore, only four of these mothers considered the advice as helpful. This is not unusual, since most husbands are no more knowledgeable than their wives concerning the management of infant crying. Other researchers have reported that husbands were the most frequently used resource for the mothers' postpartum concerns (Gruis, 1977; Harrison & Hicks, 1983) and to help cope with mothering (Mercer, 1986). However, the literature does not specifically address the mothers' perceptions of their husbands help with the concern of infant crying. Wilkie and Ames (1986) reported that fathers experienced more stress than mothers when the baby cried more than usual and were most likely to blame the mothers for the problem. In the light of the above findings, it would seem beneficial for obstetrical nurses to make every effort to consider both parents when offering anticipatory guidance about infant

crying.

As indicated in Table 16, the mothers discussed their infants crying with other family members but the advice was not always perceived by the mothers to be helpful. Two mothers reported receiving advice from their mothers-in-law that was not at all helpful. One of these mothers, who was bottle-feeding, was told that her infant was crying because he was not getting enough formula. The other, a breast-feeding mother, was told to supplement the feedings with formula, as the infants' crying was due to hunger. These findings suggest that interactions with some family members may only add to the new mother's stresses and supports Ventura's (1987) findings that interactions with other family members can be stressful for some new parents.

Results of the present study indicate that nurses are an infrequently used resource for mothers' concerns about the problem of infant crying. This finding seems unusual considering that all of the mothers received a routine follow-up visit from a public health nurse. Mothers who experienced little or no worry about infant crying may not have felt the need to discuss their infants' crying with the nurse. However, only 3 of the 16 mothers who were worried about crying discussed the problem with a public health nurse at the time of her follow-up visit. One possible explanation is that infant crying was not a worry for these

mothers at the time of the visit, especially if the visit was made during the first week. Research has shown that infant crying gradually increases during the first few weeks and is at its worst at approximately six weeks (Brazelton, 1962; Rebelsky & Black, 1982). Another possibility is that the mothers were reluctant to admit that they were worried about the crying, for fear of being seen as inadequate. Furthermore, if the nurse did not ask pertinent questions about the infants crying, the mothers may not have perceived it to be a functional duty of the nurse to be available to assist them with the management of infant crying. Public health nurses in this province are now using revised postpartum referral forms that have a check list which includes infant crying, among other behaviors. It would seem that this revised tool, if properly used, may be beneficial in helping nurses identify mothers who need advice concerning infant crying and also add to the possibility that new mothers would be encouraged to discuss their concern about infant crying with the nurse.

Of the four women in this study who received advice from nurses concerning their infant crying, only one rated this advice as very helpful. Diary data revealed that these mothers who attributed their infants crying to gas pains perceived the nurse's advice as slightly helpful. This is not surprising considering that the mothers may have been

looking for advice as to how to treat this specific problem, rather than advice about crying in general. It is interesting to note that doctors were not consulted any more frequently than nurses. Of the six mothers who discussed the crying with doctors, three had experienced a fair amount or great deal of worry whereas the other three worried very little about the crying. As stated earlier two of the mothers were informed by a doctor that their infants may have colic. These mothers rated the advice given as slightly helpful. This is to be expected, considering that the mothers were not given any specific advice concerning the management of infant colic. These findings suggest that neither doctors or nurses seem to be very well informed as to how to help mothers who have infants that are difficult to console.

Resources Providing Information on Infant Crying

Results of this study revealed that the most common resources providing information on infant crying were books or pamphlets. At the time of data collection in the hospital setting, the mothers were receiving the usual baby magazines such as Best Wishes but no hospital prepared pamphlets on infant care. Therefore it can be assumed that most of these mothers sought their own reading material. This is not unusual since the majority of these mothers had

post-secondary education. Although books and pamphlets were the most commonly used resources providing information on infant crying, the majority of mothers found them only slightly helpful. These findings support those of McKim (1987) who reported that more parents in recent years are reading child care books, pamphlets and magazine articles but many are dissatisfied with the information. Perhaps parents are dissatisfied because they expect more information than these sources promise to deliver. Nurses who are counselling parents about coping with infant crying should be familiar with current books on the market, that offer advice about infant crying and be able to help parents in their selection of reading material.

It is surprising to find that only one mother recorded receiving infant crying information from hospital postpartum classes. As previously stated, group and individual teaching was provided at the hospital and infant care topics were usually discussed (see page 39). It is possible that not all nurses address this topic during teaching sessions with parents. Another possibility is the problem of recall. Mothers are provided with so much information during a usually short hospital stay that they can not always remember all of it. This finding indicates the necessity for this information to be provided by community health nurses either during home follow-up visits or at well baby

clinics. However, results of this study revealed that few mothers received information from public health nurses and not all of the mothers perceived the information as being very helpful. Further research on these findings is essential.

Mothers Expectations and Perceptions of Their Infants' Crying Behavior

Results of the mothers' perceptions of their infants as measured by the Neonatal Perception Inventories revealed that 60.0% of the mothers in this study perceived their infants to be less trouble than the average infant on the third day postpartum, whereas 80.0% perceived their infants as less trouble by the fourth postpartum week. Five of the 40 mothers (12.5%) perceived their infants behavior to change from less trouble to the same or more trouble than the average infant, from the third postpartum day to the fourth postpartum week. All five mothers reported having some difficulties with their infants, such as excessive crying and feeding problems. This finding supports those of Snyders (1976), which revealed that mothers who perceived their infants behavior to change from positive to negative over the first postpartum month had infants who were having difficulty adapting to their environment.

The findings that mothers' worry ratings correlated

with negative perceptions at four weeks postpartum suggests that the infants' crying behavior attributed to the negative perception. However six of the eight mothers who had an overall negative perception of their infants behavior also had concerns about other infant behavior that may have affected their perceptions. The remaining two mothers had a negative perception of their infants despite the fact that their infants cried very little and the mothers were not worried about the crying. Although these findings represent a small number (N=2) they lend some support to other researchers who suggest that maternal perception of infants is influenced by factors other than the infants' behavior (Kronstadt, Oberklaid, Ferb & Swartz, 1979). It was not an objective of this study to explore factors that may influence maternal perception. However results of this study indicate that more research needs to be done on the topic of maternal perception and infant behavior, especially infant crying.

Summary

The results of this study revealed that crying was a fair amount or great deal of worry for 40% of the mothers during the first postpartum month. The mothers' worry about their infants' crying was directly related to the average

number of daily crying episodes.

The causes mothers attributed to their infants crying indicated that the mothers perceived such crying as the infants' means of signalling their needs. However, mothers identified their infants' physical needs more often than their social needs. This finding suggests that mothers may not have an adequate understanding of the social aspects of infant crying and the part it plays in the mother-infant interaction process. Mothers in this study were able to perceive differences in the effectiveness of interventions they used to soothe their infants. Some mothers appear to have a limited knowledge of different soothing interventions and their benefits for the infants' growth and development.

Results revealed that the majority of mothers in this study did not receive any information on infant crying during prenatal classes or during their postpartum period in hospital. Thus, they may not be adequately prepared for the management of neonatal crying. The majority of mothers who were worried about their infants' crying during the first postpartum month did not seek the advice of the public health nurse. Those mothers who did seek advice did not necessarily perceive the advice as being very helpful to them in managing their infants' crying.

The mothers' postpartum expectations and perceptions of their infants' behavior, as measured by the Neonatal

Perception Inventories revealed that mothers changed their perceptions from the third postpartum day to the fourth postpartum week. Findings revealed that mothers who changed their perceptions from positive to negative, had infants who experienced difficulty adapting to their environment. Furthermore, mothers who were worried about their infants' crying tended to have an overall negative perception of their infant. However, it can not be concluded from these results that infant crying was the cause of this negative perception. Furthermore, it is possible that infant behavior is only one of the many other factors that may affect the mother's perception of her infant. More research is essential in this area.

Finally, the results of this study demonstrate the interactive nature of neonatal crying and maternal responses and therefore support the appropriateness of an interactive model such as that of Thoman (1975), for studying the process. Results revealed how the infant's crying behavior affected the mother's behavior and in turn how the mother's behavior affected the infant. Results of diary data indicated that the mother's interpretation of her infant's crying behavior determined her choice of soothing intervention. The effectiveness of the mother's intervention served as feedback that she had responded appropriately. However, if the mothers response was not

effective in soothing her infant, the more interventions she tried and the more frustrated she became. Conclusions can not be made as to whether or not these mothers had correctly interpreted their infants' crying and responded appropriately. It is possible that other factors such as the infant's temperament, the mother's personality and her attitudes concerning the management of infant crying also affect the mother-infant interaction during infant crying behavior. These variables need to be considered in further research on the maternal response to infant crying.

CHAPTER VI

Limitations and Conclusions

This chapter contains the limitations of the study and the conclusions drawn from the results. Implications for nursing practice, education and research are also discussed.

Limitations

The subjects were a small (N=40) non-random sample selected from one hospital, therefore the findings can not be generalized beyond the specific population studied.

A second limitation of this study relates to the validity and reliability of the diary, which was designed by the investigator. The diary was submitted to a panel of experts to establish content validity and a pre-test was conducted prior to its use in the study. The reliability of the diary was based upon the mothers' accuracy of recording and no attempt was made to verify this. A further limitation related to this research tool is that the actual procedure of keeping the diary may have influenced the mothers' responses to their infants' crying.

Another limitation of this study is the research design. An interview with the mothers at the diary collection time would have supplemented the diary data and

may have provided a further understanding of the maternal response to infant crying.

Conclusions

The primary purpose of this study was to investigate how primiparous mothers interpret and respond to their infants' crying during the first postpartum month. The ultimate purpose was to contribute to the nurse's goal of fostering a positive mother-infant relationship. While taking the above limitations into consideration, the following conclusions are made, based on the results obtained from this particular group of subjects.

Neonatal crying causes a considerable amount of worry for primiparous mothers during the first few weeks postpartum. Therefore, neonatal crying should be addressed by nurses providing care to mothers in the early postpartum period. The causes attributed by mothers to their neonates' crying indicate a lack of understanding of the social aspects of infant crying and its role in the mother-infant interaction process. Mothers' responses to neonatal crying indicate that most new mothers are not prepared for the management of neonatal crying. The selection of interventions used by the mothers in this study suggests that new mothers have a limited knowledge of different

soothing interventions and their benefits for the infants' growth and development.

The lack of neonatal crying information offered to the mothers indicates that some nurses may be unaware of the negative effects that neonatal crying can have on the beginning mother-infant relationship. Furthermore, the lack of advice offered to those mothers who are worried about infant crying reflects the health care professionals' lack of preparation for counseling mothers on this topic. The concerns expressed by mothers in relation to infant behavior other than crying indicates that new mothers are lacking in knowledge about infant behavior in general. Therefore, these mothers may regard as a problem behavior that is in fact normal.

Implications

Nursing Practice

The nurses working with mothers during the early postpartum period need to be aware of neonatal crying as a potential source of worry for new mothers and provide them with adequate information about the purpose and meaning of neonatal crying behavior. Nurses working in combined care postpartum units have an excellent opportunity to observe mother-infant interaction and encourage mothers to share

their feelings about their infants behaviors such as crying. At this time, nurses should also make an effort to find out what the mothers' expectations are concerning their infants' behavior such as crying and offer anticipatory guidance as necessary.

Nurses who teach postpartum classes in the immediate postpartum period need to include information about the neonates' different states of consciousness and how these states affect the neonates' response to those caring for them. While discussing the crying state, mothers may be shown the kind and amount of stimulation required to calm a newborn infant. Fathers are becoming much more actively involved in neonatal care today and therefore should be encouraged to attend postpartum classes. Many fathers may not be able to attend those classes due to work commitments. Therefore, nurses should take advantage of visiting periods to find out if the father has any concerns he would like to discuss.

Research has shown that neonatal crying does not usually cause concern until during the first few weeks at home, therefore hospital maternity nurses need to provide mothers with written material containing information on neonatal crying and practical advice on now to manage this behavior. Since consistency of information is important to new mothers, it may be helpful to develop a protocol to be

used as a guide by both hospital and public health nurses working with new mothers.

Public health nurses need to be aware that new mothers who are worried about infant crying may not feel comfortable about seeking the nurse's advice. Therefore public health nurses' visits should include an assessment of the infant's crying behavior and the mother's response to this behavior. Mothers who are worried about their infants' crying should be provided with specific information that is adequate, consistent and current. The use of a 24-hour cry diary may be a helpful form of therapeutic intervention for worried mothers. The visiting nurse's inspection of this diary should provide an excellent opportunity for discussing the crying episodes and looking at possible alternatives for coping with the crying. Since many new mothers are concerned about infant behavior other than crying, the diary can be used to record other behaviors as well, such as, feeding, sleeping and awaking activity.

Nursing Education

Nurses working in community health and hospital settings need to be knowledgeable about infant crying behavior and how it affects the mother-infant relationship. This need can be at first met by introducing theory on this topic in basic nursing education programs. Nurses working

in the clinical area and in the community should be kept informed of current research findings on the maternal response to neonatal crying by means of in-service education and continuing education programs. Workshops or nursing seminars should be conducted on the topic of infant crying as a caregiving concern. These planned educational sources should provide both community and hospital nurses with an opportunity to share their concerns, experiences and discuss ways to direct mothers in the use of a problem-solving approach for coping with infant crying.

Nursing Research

As this research was confined to a non-random sample of primiparous mothers of healthy, full-term infants, it is necessary to further investigate the maternal response to neonatal crying in a larger random sample in order to be able to generalize findings beyond the specific population. This larger sample should also include mothers and infants identified as high-risk perinatal clients. Since fathers are the main source of support for mothers with crying neonates, it is necessary to include them in any further research on the topic of neonatal crying as a caregiving concern.

Findings associated with maternal worry suggest that factors other than the amount of crying may have influenced

the mothers' worry ratings. In this study variables such as the mother's age, education and previous experience had no relationship with the amount of worry. Further research is recommended to identify possible maternal and neonatal factors which may contribute to mothers' worries about crying. Of particular interest are the mother's personality, her perception of her infant's crying behavior, her attitudes concerning the management of infant crying and the infants characteristics.

Further research needs to be done to clarify how mothers learn to interpret their neonates' crying and select soothing interventions. The information obtained may explain why so many mothers attribute gas pains as a cause for neonatal crying and reveal reasons why mothers become so frustrated in trying to soothe these neonates.

Many of the mothers in this study did not receive information or advice which was helpful to them in managing their neonates' crying. More research needs to be done on this topic for the purpose of providing helpful information for nurses planning anticipatory guidance or counseling new mothers. Of particular interest is what type of information mothers would like to receive about infant crying and at what time would they like to receive this information. The latter question may be helpful in deciding if the information is best provided during prenatal classes,

hospital postpartum classes and/or during follow-up visits at home.

In conclusion, this study accomplished the purpose of investigating and describing how primiparous mothers interpret and respond to their infants' crying during the first postpartum month. The information obtained in the study indicates the need for new mothers to be better educated about infant behavior, particularly crying. Findings also revealed the need for nurses to provide more appropriate information and effective nursing care to mothers who are worried about their infants' crying behavior. However, much more research needs to be done to fully understand the relationship between neonatal crying and maternal responses.

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Appendix A

Instructions for Use of Diary

Important.

1. Please keep record every day for seven days, start recording at 12 midnight Saturday and continue until 12 midnight the following Saturday.

2. If you need any further instructions while keep the diary please call me (Elizabeth O'Driscoll) at this number - 754-2597.

This diary contains an identical sheet for each day of the week. Across the top of each sheet is a daily clock on which you are asked to record your baby's crying, feeding and sleeping patterns. This clock shows 15 minutes slots for each 24 hours. When making your entries it is not necessary to know the exact duration of each crying episode. A cry of 5 minutes gets the same entry of one lasting 10 minutes, if it falls into one of the 15 minute slots provided on the daily clock.

In recording your baby's crying, feeding and sleeping please use the following symbols: C = Crying, F = Feeding, and a straight line (_____) refers to sleeping.

Guidelines for Answering the Questions Listed in the Diary

Question #1

This list includes some common causes of infant crying. It is not complete, however; and you are asked to add any other reasons that you think caused your baby to cry. Indicate which crying episode you are referring to, by placing the time that the baby cries in front of the cause(s) for the crying.

Question #2

This list includes some feelings that mothers may experience when their babies cry. You may have some feelings that are not on the list. If so please write how you feel in the space provided. Again, indicate which crying episode you are referring to, by placing the time that the baby cried in front of the feeling(s) experienced at that time.

Question #3

This list includes some common interventions used to soothe a baby. It is not complete, however, and you are asked to add anything else that you do to soothe your baby. Place the time of the crying episode in front of the intervention(s) used at that time.

Question #4

Some interventions are more effective than others. You are asked to indicate the effectiveness of your invention by placing a check (✓) in the appropriate space provided.

Do not forget to answer the questions on the last page of your diary. If you need more space in answering any of the questions in the diary, please feel free to write on the back of the page.

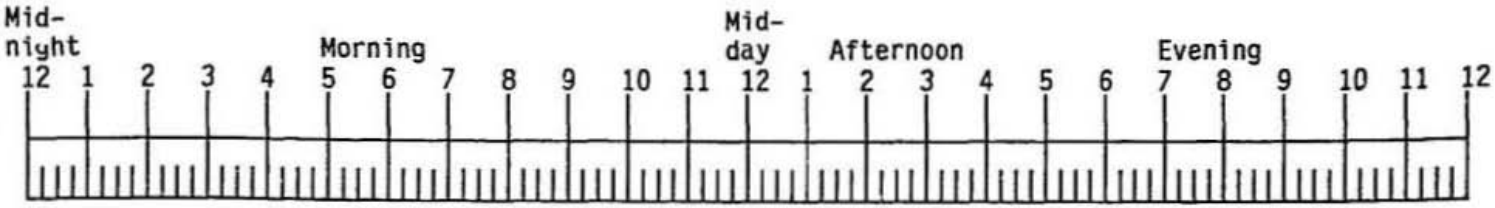
Thank you for your cooperation.

Appendix B

C = Crying F = Feeding _____ = Sleeping

START DATE _____

DAY _____



1. What do you think was the cause for your baby's crying episodes today?

Time	Causes
_____	hunger
_____	gas pains
_____	fatigue
_____	restlessness
_____	wet diaper
_____	loneliness
_____	discomfort
_____	cause unknown
_____	other (specify)

2. How did you feel each time your baby cried today?

Time	Feelings
_____	frustrated
_____	worried
_____	bothered
_____	concerned
_____	sad
_____	anxious
_____	affectionate
_____	other (specify)

3. Which of the following interventions did you use to soothe your baby today?

Time	Interventions
_____	feed baby
_____	give pacifier
_____	talk to baby
_____	sing to baby
_____	carry in arms
_____	stroller ride
_____	car ride
_____	rock baby
_____	other (specify)

4. How effective was each of those interventions?
0 = not at all
1 = somewhat, 2 = very

0	1	2

5. Did you discuss the baby's crying with any of the following today?

_____ friend
_____ husband
_____ mother
_____ nurse
_____ doctor
_____ other (specify)

6. Did anyone of those people offer advice on how to manage infant crying?
_____ Yes _____ No
If yes, whom? _____

7. Briefly state the kind of advice offered.

8. How helpful was this advice?
_____ Slightly helpful
_____ Very helpful
_____ Not at all helpful

9. Did you have any other concerns about your baby today?
_____ Yes _____ No
If yes, explain.

10. Did anything unusual happen today that influenced how you cared for your baby?
_____ Yes _____ No
If yes, explain.

Appendix C

1. How much schooling have you completed?

_____ Less than High School
_____ High School
_____ Some University
_____ University
_____ Vocational College
_____ Other (specify)

2. How much previous experience have you had taking care of infants of one month of age or less?

_____ none
_____ very little
_____ a fair amount
_____ a great deal

3. How did you get this experience?

_____ family
_____ friends
_____ occupation
_____ babysitting
_____ other (specify)

4. Did any of the following services provide information about infant crying?

_____ Prenatal classes
_____ Hospital classes
_____ Doctor
_____ Hospital Nurse
_____ Public Health Nurse
_____ Books or pamphlets

5. How helpful was this information in assisting you to manage your infants crying?

_____ slightly helpful
_____ very helpful
_____ not at all helpful

6. How much has infant crying been a worry for you?

_____ not at all
_____ very little
_____ a fair amount
_____ a great deal

Appendix D

Neonatal Perception Inventory I

Average Baby

Although this is your first baby, you probably have some ideas of what most little babies are like. Please check the blank you think best describes the **Average** baby.

1. How much crying do you think the average baby does?

   _____ a great deal
   _____ a good bit
   _____ moderate amount
   _____ very little
   _____ none

2. How much trouble do you think the average baby has in feeding?

   _____ a great deal
   _____ a good bit
   _____ moderate amount
   _____ very little
   _____ none

3. How much spitting up or vomiting do you think the average baby does?

   _____ a great deal
   _____ a good bit
   _____ moderate amount
   _____ very little
   _____ none

4. How much difficulty do you think the average baby has in sleeping?

   _____ a great deal
   _____ a good bit
   _____ moderate amount
   _____ very little
   _____ none

5. How much difficulty does the average baby have with bowel movements?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

6. How much trouble do you think the average baby has in settling down to a predictable pattern of eating and sleeping?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

Your Baby

While it is not possible to know for certain what your baby will be like, you probably have some ideas of what your baby will be like. Please check the blank that you think best describes what your baby will be like.

1. How much crying do you think your baby will do?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

2. How much trouble do you think your baby will have feeding?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

3. How much spitting up or vomiting do you think your baby will do?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

4. How much difficulty do you think your baby will have sleeping?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

5. How much difficulty do you expect your baby to have with bowel movements?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

6. How much trouble do you think that your baby will have settling down to a predictable pattern of eating and sleeping?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

Neonatal Perception Inventory II

Average Baby

Although this is your first baby, you probably have some ideas of what most little babies are like. Please check the blank you think best describes the **Average** baby.

1. How much crying do you think the average baby does?

   _____ a great deal
   _____ a good bit
   _____ moderate amount
   _____ very little
   _____ none

2. How much trouble do you think the average baby has in feeding?

   _____ a great deal
   _____ a good bit
   _____ moderate amount
   _____ very little
   _____ none

3. How much spitting up or vomiting do you think the average baby does?

   _____ a great deal
   _____ a good bit
   _____ moderate amount
   _____ very little
   _____ none

4. How much difficulty do you think the average baby has in sleeping?

   _____ a great deal
   _____ a good bit
   _____ moderate amount
   _____ very little
   _____ none

5. How much difficulty does the average baby have with bowel movements?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

6. How much trouble do you think the average baby has in settling down to a predictable pattern of eating and sleeping?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

Your Baby

You have had a chance to live with your baby for about a month now. Please check the blank you think best describes your baby.

1. How much crying has your baby done?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

2. How much trouble has your baby had feeding?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

3. How much spitting up or vomiting has your baby done?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

4. How much difficulty has your baby had in sleeping?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

5. How much difficulty has your baby had with bowel movements?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

6. How much trouble has your baby had in settling down to a predictable pattern of eating and sleeping?

_____ a great deal
_____ a good bit
_____ moderate amount
_____ very little
_____ none

Source: Elsie R. Broussard, M.D. (1964).

Appendix E

51 Gambier Street
St. John's, NF
Canada
A1B 3G2

July 2, 1987

Dr. Elsie R. Broussard, M.D., Ph.D.
Department of Health Services Administration
Graduate School of Public Health
University of Pittsburg
130 DeSoto Street
Pittsburgh, Pennsylvania 15261

Dear Dr. Broussard:

I am a Graduate student in the Maternal-Child Nursing Program at Memorial University of Newfoundland.

I am writing to ask your permission to use The Neonatal Perception Inventory as a data collection tool for a study I am conducting. In this study I will investigate the emotional and behavioral responses of primiparous mothers to the crying of their infants during the first postpartum month. The study will also investigate the mother's perceptions and expectations of her infant.

As part of the data collection, I plan to ask mothers to fill out Part 1 in the hospital and to complete Part 2 during a four week follow-up visit in their homes. I will need at least 60 tools. Please inform me of the cost and I will forward the money upon receipt of the tools.

Should you be interested in having a copy of the results of my study, I will be glad to forward them to you.

Sincerely,

Elizabeth O'Driscoll, R.N., B.N.

PERMISSION TO USE THE NEONATAL PERCEPTION INVENTORIES

Permission is hereby granted to use the Neonatal Perception Inventories in the study as outlined by you on the form entitled "Information Regarding Proposed Use of the Broussard Neonatal Perception Inventories," dated 9/10/77, with the following conditions:

1) that the NPI be administered in accordance with the method described on that form;

2) that you provide me with the results of your study, including the individual raw data scores of the Neonatal Perception Inventories.

I HAVE READ THE ABOVE AND AGREE TO THE CONDITIONS OUTLINED.

Signed: _____

Witness: _____

Permission Granted: _____ _____
Elsie R. Broussard, PhD. date

Appendix F

Procedure of Administration

The Average Baby form is always presented to the mother prior to administration of the Your Baby form.

Average Baby Form

The mother is handed the Average Baby form while the interviewer says:

> "You probably have some ideas of what most little babies are like. Will you please check the blank you think best describes what most little babies are like?"

The interviewer remains with the mother during the entire procedure. When the mother has completed the Average Baby form, the interviewer takes it from the mother.

Your Baby Form

Next the interviewer gives the mother the Your Baby form and instructs the mother as follows:

> "You have had a chance to live with your baby for about a month. Please check the blank you think best describes your baby."

If the mother expresses hesitancy or uncertainty about the NPI items, she can be encouraged to complete the forms by comments such as: "There are not right or wrong answers;

we are interested in what you think." The interviewer should not define the ratings for specific types of behavior. For example, the interviewer should not attempt quantification by comments such as "If your baby spits up after every meal, you should check off 'a good bit'." Since we wish to obtain the mother's perception, it is essential not to influence her response to our opinions.

The interviewer should not examine or score the forms in the presence of the mother.

Scoring the NPI

1. Each behavioral team is scored on a 5 point scale ranging from "a great deal" (5 points) to "none" (1 point).

2. The numerical value for each item is added to give a total score for each of the forms. Thus a total score is obtained for the Average Baby form and the Your Baby form. The NPI score is obtained by subtracting the total score of the Your Baby inventory from the total score of the Average Baby inventory. The difference between the two scores represents the NPI score.

3. A score of +1 or greater indicates a positive perception of the infant. The infant is considered to be at low risk.

4. A score of zero, -1 or less indicates a negative perception of the infant. The infant is considered to be

at high risk for subsequent psychosocial disorder.

Appendix G

1. Age

2. Birth place

3. Marital status

4. Attended prenatal classes. Yes _____ No _____

5. Rooming in with baby. Yes _____ No _____

6. Method of infant feeding.
   Breast _____ Bottle _____ Both _____

7. Induction of labor. Yes _____ No _____

8. If yes, how? Arm _____
   Oxytocic _____
   Both _____

9. Duration of Labor

   1st stage _____
   2nd stage _____
   3rd stage _____
   Total _____

10. Anaesthesia

    Local _____
    Epidural _____
    General _____

11. Delivery

    NSD _____
    Forceps _____
    Cesarean _____

12. Newborn

    Gender Female _____
    Male _____

13. Apgar Scores

    1 minute _____
    5 minutes _____

Appendix H

Letter of Explanation and Consent Form

Dear

My name is Elizabeth O'Driscoll. I am a Registered Nurse who has worked with mothers and infants both in the hospital and in the community. I am at present completing a post-graduate nursing degree at the School of Nursing, Memorial University.

I am very interested in learning more about helping new mothers with the care of their newborn. I am particularly interested in the new mothers' feelings and concerns about infant crying. Some babies cry very little and others cry a lot. Greater knowledge about infant crying and the effects it has on caregivers will be very helpful for nurses planning more adequate care for new mothers and their infants in the future.

If you are willing to participate in the study, I will meet and talk with you in the hospital prior to discharge. At this time you will be asked to complete a short questionnaire. You will be asked to keep a daily diary of your baby's crying for one week at home (3rd week postpartum) and also record how you feel when the baby cries and what you find is effective in soothing your baby. You will be given the diary and complete directions on how to record the required information.

When your baby is four weeks old, I will arrange to visit you in your home at a mutually convenient time. At this time I will collect the diary and ask you to complete another short questionnaire. The first visit in hospital will be about 20 minutes and the second visit at home will take about 10 minutes. Both questionnaires will only take about 5 minutes to complete.

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 and your baby in the report that is made of this study. Participation in this study will not involve any risks, either to you or your infant. Hopefully you will benefit from having the opportunity to discuss your concerns with

a sincerely interested nurse. You are free to withdraw from this study at any time by notifying me. Such a decision on your part will in no way affect the nursing care you are receiving at present or in the future.

I will be available to explain the study with you in more detail and to answer any questions you may have prior to making your decision to participate.

Consent Form

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

Name: _____

Date: _____

Witness: _____

Appendix I

51 Gambier Street
St. John's, NF
A1B 3G2

February 10, 1988

Dr. D.W. Ingram
Chairman
Human Investigation Committee
St. Clare's Mercy Hospital
LeMarchant Road
St. John's, NF
A1C 5B8

Dear Dr. Ingram:

I am a registered nurse currently enrolled in the School of Graduate Studies, Department of Nursing, Memorial University of Newfoundland. In partial fulfillment of the requirements for the Masters of Nursing Degree, I am required to conduct a research study. The study is under the direction of Dr. Mary Jo Bulbrook.

The purpose of this letter is to request your permission to select patients who have delivered at your hospital to procure the study sample.

This study, descriptive in design, will involve exploration of the maternal response to infants' crying during the first postpartum month. The study will be conducted in two phases: Phase I which will take place in hospital two or three days following delivery, will require the mothers to fill in a short questionnaire on neonatal perception. Phase II will take place at home four weeks later to investigate the mother's emotional and behavioral response to infant crying.

I enclose my proposal and the complete Human Investigation Committee form for review by the committee. The study has already been reviewed and approved by the Human Subjects Review Committee of the School of Nursing, Memorial University of Newfoundland (see enclosed letter).

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 eligible subjects.

I anticipate the data collection, Phase I, will take one to three months, from February 1988 to April 1988.

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,

Elizabeth O'Driscoll, R.N., B.N.

Appendix J

51 Gambier Street
St. John's, NF
A1B 3G2

February 10, 1988

Sister Phyllis Corbett
Assistant Executive Director of
Patient Care Services
St. Clare's Mercy Hospital
LeMarchant Road
St. John's, NF
A1C 5B8

Dear Sister Phyllis:

Further to our meeting on December 18, 1987 I have written the Human Subject Investigation Committee at St. Clare's Mercy Hospital, for permission to conduct part of my research study at this hospital.

Enclosed is a copy of the letter and my proposal which I have sent to Dr. Ingram. If you wish any further information, please contact me at this phone number - 754-2597.

Thank you very much for your interest and assistance.

Yours sincerely,

Elizabeth O'Driscoll, R.N., B.N.
Encls.

Appendix K

51 Gambier Street
St. John's, NF
A1B 3G2

February 25, 1988

Dear Doctor:

I am writing to inform you of a nursing research study, part of which will be conducted at St. Clare's Mercy Hospital and may involve some of your patients.

The purpose of this study is to investigate the primiparous mother's emotional and behavioral response to her crying infant during the first postpartum month.

Research has indicated that neonatal crying is a primary concern for new mothers. In order for nurses to provide anticipatory guidance and/or nursing intervention to those mothers, they will need an adequate understanding of neonatal crying and its effects on the mother.

Participation by the mothers is voluntary. The study will require the mothers to fill in a short questionnaire during the second or third day postpartum. The remainder of the study will be conducted in the mother's home four weeks postpartum. Mothers have agreed to keep a daily diary record of their babies' crying and their responses to the crying, for a period of one week (3rd week postpartum).

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

If you have any questions or concerns relating to the study, I will be pleased to discuss them with you. My home telephone number is 754-2597.

Yours sincerely,

Elizabeth O'Driscoll, R.N., B.N.
Graduate Student

APPENDIX L

Total Daily Crying Episodes of Forty Neonates During the 3rd Week Postpartum

Sex	Feeding Method	Episodes of Crying Day 1 (Sun) to Day 7 (Sat)							Total Weekly Episodes	Average Daily Episodes	Mothers' Worry Rating
		Sun	Mon	Tue	Wed	Thur	Fri	Sat			
M	Bottle	14	8	15	10	3	10	5	65.0	9.29	3
M	Bottle	6	7	6	4	5	9	6	43.0	6.14	2
F	Breast	10	9	8	11	5	9	7	59.0	8.43	2
F	Breast	13	15	13	15	11	11	14	92.0	13.14	3
F	Breast	10	7	8	3	3	4	6	41.0	5.86	2
F	Breast	6	7	5	5	6	9	7	45.0	6.43	3
M	Breast	10	17	11	10	12	12	12	84.0	12.00	2
M	Bottle	3	0	1	1	0	0	0	5.0	.71	3
M	Breast	0	11	9	6	4	2	1	33.0	4.71	2
F	Breast	11	8	11	5	6	4	6	51.0	7.29	2
F	Breast	1	2	1	1	1	1	2	9.0	1.29	2
F	Breast	7	9	9	11	10	8	9	63.0	9.00	2
M	Bottle	5	9	4	4	4	5	2	33.0	4.67	2
M	Breast	5	1	0	0	3	1	0	10.0	1.43	2
F	Breast	11	5	11	7	8	10	9	61.0	8.71	2
M	Bottle	10	7	6	8	9	5	4	49.0	7.00	4
F	Breast	5	3	2	3	4	2	3	22.0	3.14	2
M	Breast	5	8	8	8	6	7	7	49.0	7.00	2
M	Breast	8	7	13	11	9	11	15	74.0	10.57	2
M	Breast	8	12	12	7	10	11	7	67.0	9.57	3
M	Bottle	6	4	3	11	6	6	4	40.0	5.71	3
F	Bottle	5	6	5	6	7	9	10	48.0	6.89	3
F	Bottle	3	4	6	6	6	5	5	35.0	5.00	2
F	Breast	1	0	0	0	1	1	0	3.0	.43	1
F	Bottle	2	2	2	3	3	3	2	17.0	2.43	2
F	Bottle	6	6	6	6	5	5	6	40.0	5.71	2
F	Bottle	8	10	6	7	8	3	8	50.0	7.14	3
F	Bottle	11	10	12	7	10	7	9	66.0	9.43	3
F	Breast	12	11	14	12	5	10	9	73.0	10.43	1
F	Bottle	11	13	11	11	10	7	9	72.0	10.29	3
F	Bottle	7	8	7	5	7	4	9	47.0	6.71	3
M	Bottle	10	10	9	11	7	11	8	66.0	9.43	3
M	Breast	14	9	14	16	11	9	12	85.0	12.17	3
M	Bottle	5	8	8	8	6	9	7	51.0	7.29	2
F	Bottle	9	5	5	3	3	1	0	26.0	3.71	2
M	Breast	11	10	8	7	8	6	5	55.0	7.83	4
F	Breast	4	4	16	6	8	6	7	51.0	7.29	2
F	Bottle	2	0	1	2	1	1	1	8.0	1.14	2
F	Bottle	2	2	2	2	1	0	0	9.0	1.29	2
M	Breast	10	17	4	4	12	10	9	66.0	9.43	3
Mean		7.18	7.28	7.30	6.58	6.13	6.15	6.17	46.57	6.65	2.4