

From Department of Woman and Child Health
Karolinska Institutet, Stockholm, Sweden

Care of the newborn infant during maternal-infant separation

The father as primary caregiver immediately after birth and the
mother's experiences of separation and later reunion with the infant

Kerstin Erlandsson



**Karolinska
Institutet**

Stockholm 2007

“A change of world view can change the world viewed”
(JC Pearce)

All previously published papers were reproduced with permission from the publisher.
Published by Karolinska Institutet. Printed by Universitetservice US-AB.

© Kerstin Erlandsson, 2007
ISBN 978-91-7357-373-3



ABSTRACT

Care of the newborn infant during maternal-infant separation

Kerstin Erlandsson, Department of Woman and Child Health

The overall aim of the thesis was to describe care of the newborn infant immediately after birth, during maternal-infant separation; the father as primary caregiver and the mother's experiences of separation and later reunion with the infant, in order to enhance development of care for the newborn infant during maternal-infant separation. In study **I**, **II** and **III** a phenomenological approach was used to gain access to mothers' and fathers' lived experiences (**I**, **III**) and lifeworld (**II**). Six interviews with mothers with experiences of separation and later reunion with their infants (study **I**) and interviews with 15 fathers taking care of their infants as primary caregivers during maternal-infant separation (study **III**) were included in the analyses. Study **II** was an observation study through videotape recording of 15 fathers taking care of their infants during the first two hours after birth. For the purpose of study **IV** and **V**, a quantitative design with naturalistic observations, audiotape recordings and respiratory monitoring was used. The infants in study **IV** and **V** were randomly assigned two groups: being cared for skin-to-skin with their father who was seated comfortably in an armchair or being placed in a cot, with their father seated beside them. Data was collected from 29 (study **IV**) and 13 infants (study **V**) respectively.

The essence of the mothers' experiences (study **I**) was their strong desire to be close to their babies during maternal-infant separation. Mothers wanted to be close to their babies whatever the circumstances, and to be kept fully informed at all times. It was the mothers' experience that the organization, staff and other circumstances prolonged the separation. The essence of fathers lived experiences while taking care of their infant while mother and child were apart (study **III**) yielded a meaning of alterability towards togetherness between father and child. This movement meant immediate and gradual alterability within the father himself that made him gradually undertake the responsibility, as he got to know his child. The essence of the father's observed lifeworld in study **II** yields the very first experience of the father coming increasingly closer to the newborn infant and revealing an ebb and flow variation in the father's involvement with the child. There was an ebb and flow between becoming a father and a physical withdrawal, rather than immediately taking the practical approach of becoming a resource for the infant. In study **IV** the infants in the skin-to-skin group cried less than the infants in the cot group ($p < 0.001$). Rooting activity was more frequent in the cot group than in the skin-to-skin group ($p < 0.01$), as were sucking activities ($p \leq 0.001$). The pattern for wakefulness showed a lower level for the skin-to-skin group when compared with the cot group ($p < 0.01$). The infants in the skin-to-skin group of study **V** showed higher inspiratory and expiratory air flows, larger breath volume (all ($p < 0.001$)) and minute ventilation when compared with the cot group. A caregiving model, where fathers hold their infants skin-to-skin in an upright position on their chest, seemed to have a positive impact on the infant's well-being. At the same time, the father took the child to himself. The mothers, separated from their child, had a strong desire to be close to the baby.

Keywords: separation, father-infant bonding, full-term, skin-to-skin care, cesarean birth, cry, prefeeding, breathing, phenomenology
ISBN: 978-91-7357-373-3

LIST OF PAPERS

This thesis is based on the following papers, referred to in the text by their Roman numerals:

- I. Erlandsson K, Fagerberg I. Mothers' lived experiences of co-care and part-care after birth, and their strong desire to be close to their baby. *Midwifery*. 2005;21:131-8.
- II. Erlandsson K, Christensson K, Fagerberg I. Fatherhood as Taking the Child to Oneself: A Phenomenological Observation Study after Caesarean Birth. *Indo-Pacific Journal of Phenomenology*. 2006;6(2):1-9.
- III. Erlandsson K, Christensson K, Fagerberg I. Fathers' Lived Experiences of Getting to Know Their Baby While Acting as Primary Caregivers Immediately Following Birth. Submitted.
- IV. Erlandsson K, Dsilna A, Fagerberg I, Christensson K. Skin-to-Skin Care with the Father after Cesarean Birth and Its Effect on Newborn Crying and Prefeeding Behavior. *Birth*. 2007;34(2):105-14.
- V. Erlandsson K, Christensson K, Dsilna A, Jónsson B. Do caregiving models after cesarean birth influence the infants' breathing adaptation? Submitted.

Paper I, II and IV was reprinted with permission from respective journals.

CONTENTS

1	Introduction	1
2	Background.....	2
2.1	Historical perspectives	2
2.2	The newborn infant.....	4
2.2.1	Physiological adaptation processes: breathing adaptation, crying, and breast-seeking behavior.....	4
2.2.2	Psychological processes, attachment-bonding, skin-to-skin.....	6
2.2.3	The role of the father	7
2.2.4	Caring routines and separation	8
2.2.5	The role of professionals.....	9
3	The overall aim of the thesis	11
4	Methods	12
4.1	Design	12
4.2	Settings.....	12
4.3	Participants and procedure	13
4.3.1	Study I.....	14
4.3.2	Study II	14
4.3.3	Study III.....	15
4.3.4	Study IV, V.....	15
4.4	Data collection.....	17
4.4.1	Interviews (study I, III)	17
4.4.2	Videotape recording (II).....	18
4.4.3	Naturalistic observations and audiotape recording (study IV), and respiratory monitoring (study V)	19
4.5	Data analyses	21
4.5.1	Study I.....	21
4.5.2	Study II, III	22
4.5.3	Study IV, V.....	23
4.6	Ethical considerations.....	24

5	Results.....	26
5.1	The essence in studies II and III.....	26
5.2	Skin-to-skin care with the father after cesarean birth and its effect on newborn crying and pre-feeding behavior (study IV)	27
5.3	Caregiving models after cesarean birth influence the infants breathing adaptation (study V)	29
5.4	Phenomenological descriptions (study II, III) related to quantitative data (study IV, V).....	30
5.4.1	Father’s care of his child during wakefulness and sleep (studies II and III).....	30
5.4.2	Father’s care while comforting his crying child (studies II and III).....	32
5.4.3	Breast-seeking behavior and father’s skin-to-skin care (studies II and III).....	33
5.4.4	Father’s care while observing his child’s breathing (study II).....	33
5.5	Descriptions of mothers’ lived experiences of mother-infant separation and later reunion (study I), and fathers balancing alienation as primary caregivers (study III).....	34
5.6	Further understanding of the results (study I - V)	36
6	Discussion.....	37
6.1	Result discussion	37
6.1.1	Comfort and approach.....	37
6.1.2	Separation and distress	39
6.1.3	Comfort and approach or separation and distress	40
6.2	Methodological considerations	41
6.2.1	Issues of trustworthiness and transferability	43
6.2.2	Issues of validity, reliability and generalization.....	44
6.3	Conclusion	45
6.4	Clinical Implication	45
6.5	Further Research.....	46
7	References.....	52

ABBREVIATIONS

CI	Confidence Interval
g	grams
n	number
NBAS	Neonatal Behavior Assessment Scale
NICU	Neonatal Intensive Care Unit
NIDCAP	Newborn Individualized Developmental Care and Assessment Program
p	p-value
r_s	Spearman rank order correlation coefficient
RCT	Randomized Control Trial
SD	Standard Deviation
UK	United Kingdom
WHO	World Health Organization
wk	weeks
yr	years

DEFINITIONS AND TERMS AS USED IN THE THESIS

The **lifeworld** is the complex, lived reality that is there for us whatever we do. The lifeworld precedes all knowledge and we can never escape the lifeworld. As long as we live we have a world and the connection is the body and when we are, we are intentional beings [1].

The word **father** is used consequently within the present thesis because fathers participated in study **II-V**. However, the word father could be replaced with the word partner. The words **mother** and **maternal** are synonymous.

The fathers' **presence** with his child was defined as a father being together with the child, during the first hours after the infant's birth. **Care** involves the fathers' presence and togetherness with his child, his taking care of the child as natural care involving intersubjectivity and the ethical demand [2, 3].

Skin-to-skin was defined as when the baby was held skin-to-skin on the breast/chest or had body contact. In **skin-to-skin care** (study **IV** and **V**) the baby was held skin-to-skin in a prone, upright position on the father's chest.

Taking care was in study **III** defined as when a father was together with his child, and **primary caregiver** was defined as a father taking care of his child when mother and child were apart, providing natural care for their infant, with nursing care not included. **Caregiving dyad** includes caring for the other, e.g. parent for his/her child. In each dyad, one is the caregiver and the other the cared-for.

The word **pre-feeding** was used interchangeably with **breast-seeking behavior**. The words **birth**, **delivery** and **labor** were used interchangeably in the present thesis, as well as the words **baby**, **child**, **infant** and **newborn**. The spelling of the word **caesarean** respectively **cesarean** was used interchangeably.

The word **separation** has been used differently in the studies included in the present thesis. It was defined in the first study (study **I**) as "Mother and baby are not in the same room or may not even be in the same ward or hospital". Due to the results in study **I** separation for the mothers comprises their lived experiences described in the result section. **Maternal-infant separation immediately after birth** could also be understood to take place during the first hours following birth if the baby was not placed skin-to-skin on the mother's chest with opportunity to "crawl" to the breast and suck. Mother and child were apart. **Separation** in the results of study **IV** and **V** was when the baby was not being cared for skin-to-skin (study **IV**, **V**).

1 INTRODUCTION

In western countries, hospital organization, traditions and structures have developed during the past century. The “natural childbirth movement” and the theory of bonding rose in popularity in the 1970s and came to influence hospital practices. Since then, the practice of separating mothers from their infants immediately following normal birth diminished in many hospitals. Most research included in the theory of bonding focused on the mother-infant dyad, and focused on natural deliveries and vaginal deliveries with interventions, explaining factors for disturbed mother-infant dyad. Little research had sought to describe the care of the newborn infant in need of warmth, security, comfort and attachment when an interruption in the mother-infant dyad took place, for various reasons having to do with mother and/or child. Despite the now understood beneficial effects of mother-infant dyad, newborns are still often being separated from their mothers during part or all of the first hours immediately following birth. Routine care still promotes separation despite knowledge of the consequences. In addition, the rate of cesarean birth delivered infants is continuously increasing, often with mother-infant separation as an outcome. With this in mind it seemed important to investigate further the effects of possible caring alternatives for full-term infants, during maternal-infant separation immediately following birth, because it has not been widely studied. Parental involvement following birth has been promoted by midwives. However, from a worldwide perspective, the father is probably seldom involved in care of the newborn infant, although it should be the midwife’s responsibility to ensure that the entire family and especially the father is informed, supported and enabled in order to take responsibility for care of the newborn infant during periods of maternal-infant separation, after for example a cesarean section. To recognize fathers as resources and primary caregivers for the infant immediately after birth, there was a need to study the infant’s behavior when in skin-to-skin care with the father and how the bond between father and child is developed.

This thesis has its foundation in daily nursing and midwifery work. During home deliveries, when I worked in Somalia in the mid 1980s, I noticed other women taking care of the child during maternal-infant separation immediately following birth. When I again was working in the West, I noticed hospital ward routines that separated the baby from its parents. After a cesarean section, for example, the mother was transferred to the postoperative ward while the baby remained in the delivery or maternity unit and the father alternated between the ward units and stayed either with the mother or the baby. Routine separation of mother and infant occurred when, sometimes after planned cesarean section that required spinal analgesia, mothers did not feel well; or when the child was under observation at the neonatal intensive care unit (NICU), and the mother remained at the delivery or postoperation ward until a decision was made as to whether or not the mother and child would stay on the co-care ward. I worked at that time on a co-care ward and noticed crying infants lying in cots, sucking on their hands, seeking for the breast while the father went to see the mother on the delivery or postoperative ward. In hospital settings, separation between mother and child can also take place after complicated deliveries, such as retention of placenta, rupture of vagina, bleeding or sphincter rupture. The child may also be transferred to a NICU due to fast breathing, low blood glucose or other health problems.

2 BACKGROUND

2.1 HISTORICAL PERSPECTIVES

Childbirth, including early postpartum care varies around the world and has evolved over time in parallel with traditions, society and medical developments within the health care system.

Johan von Hoorn (1662-1724) introduced the medical paradigm in obstetric care over 300 years ago [4]. We do not know much about the care of the newborn infant in Sweden before that time, when childbirth was a matter of women in “secret rooms” [5, 6]. But one can assume that both separation and non-separation took place between mother and child after a natural childbirth depending on traditions and class in society, as it does today in different cultures around the world reflecting local traditions and level of medical development [6, 7]. Fathers’ involvement in care of the newborn probably also differ historically within cultures. About 300 years ago in Sweden, it has been described that fathers took care of the newborn until the mother recovered. He was the first one to enter the “secret room” after the delivery and it was his responsibility to take care of the newborn and this provided an opportunity to bond with his child [6].

The medical paradigm following the work of von Hoorn enhanced the development of midwifery. Trained midwives and doctors worked through a period of simultaneous socioeconomic and medical development, and reduced child and maternal morbidity and mortality in Sweden [4]. Descriptions exist from around 1850 of the baby being placed on the mother’s chest for breastfeeding after delivery at home. At that time in history, the father could be present in the delivery room to support the mother with the blessing of midwives [6]. However, from the 19th to the 20th centuries, the fathers’ role of taking care of the child after delivery was replaced by women’s care; at the same time fathers became less involved with their children due to social and cultural factors [8]. As pregnancy, childbirth and care of the newborn infant became concerns for the health care system in the western society during the 20th century, fathers became marginalized [6, 9].

The focus on medical safety for mother and child during the 20th century in western cultures resulted in hospital routines separating not only fathers from mother and child, but even mothers from their babies shortly after birth [6, 10]. Concerns persist today, for example, that infants will become cold during breastfeeding in skin-to-skin contact with the mother [11], and in some societies babies are dressed before being given to their mothers; in others they are placed naked on their mother’s bare chest at birth [12, 13].

In the 1970s and 1980s the “natural childbirth movement” emerged as a reaction against the hospital-based, high-technology deliveries in western countries, with the attempt to return to the nature of childbirth and the perceived essence of midwifery as being “with woman” [14, 15]. At that time, care of the newborn infant was influenced by the work of Klaus and Kennel, showing the beneficial psychological effects of the biological functions of the maternal bonding process [16]. The view of mother-infant interaction was also influenced by the ethological approach within the theory of attachment. Attachment was seen as an instinctive, biologically pre-programmed pattern, and a foundation for the child’s social and emotional attachment later in life

[17, 18]. Fathers' involvement in institutionalized childbirth care during the "natural childbirth movement" can be seen as a turning point.

Influenced by the realization of gender issues on women's health, as well as women's experiences and desires, men attended antenatal classes and the birth, while maternity policies and practices started to take into account the role of fatherhood [19]. In Nordic culture, paternal leave was offered as a way of helping parents establish themselves after the birth of a baby [20] and gender roles may possibly have changed. Although, as described earlier, this was not a new event in history as fathers had previously been involved in both pregnancy, childbirth and care of the newborn infant [6].

Whithin the past 15 years in western societies, however, the wave of the "natural childbirth movement" has ceased and has been more or less replaced by a "new" medical focus that resulted in a worldwide increase in cesarean sections during the 1990s [14, 21]. In a report by the World Health Organization (WHO), the median rate of cesarean delivery was 33% in eight countries in Latin America with the highest rates noted in private hospitals (51%). The rates were heightened by primiparity and previous caesarean birth. The increased incidence of cesarean births was positively associated with postpartum morbidity for both the child and the mother and antibiotic treatment [21]. The incidence of respiratory distress in elective cesarean section delivered infants was higher than for vaginal births (3.6% v 0.53%) [22], leading to admission of the child to NICUs [21]. These cesarean section rates in Latin America were among the highest in the world comparable with Taiwan (33%) [23] and 30.2 % in the United States in 2005 [24].

In Hong Kong, Japan and United Kingdom (UK), the rate was about 10% less than the rates in Latin America, Taiwan and the United States [23, 25]. In Sweden, the caesarean section rate was 11% in 1980 and increased to a rate of 17% in 2005 [26]. The rate in the UK showed the same trend, rising from 9% in 1980 to 22% in 2003 [25]. In Canada, the rate was 18.2% in 1991/1992 and 21.2% in 200/2001 [27]. At a tertiary hospital in Pakistan, the rate of caesarean section was 21% during a 6 month period in 2000/2001 [28]. In contrast, 11 countries in the Arab region had a caesarean rate ranging between 5-15%, which was still within the WHO recommended level [29].

Mothers in Sweden today request cesarean section without obstetric or medical indication [30]. This "humanistic" indication of total cesarean section rate was 9% in Sweden in 2001, and showed the greatest increase among all indications [31]. From an international perspective, for many babies, the caesarean birth has probably resulted in separation from their mothers [21].

Worldwide, it has been identified by WHO that family members act as the primary caregivers as a result of the global lack of professional midwives, because it is family members who are usually present during the entire postpartum period and ready to take care of any minor care problems that might arise [32]. Hospitals in parts of the world, where for religious and cultural reasons fathers were not allowed to be involved in childbirth or early interaction with the child in the 1970s, began later on to change their maternity policies and today the policies support fathers participation [33, 34]. This trend might have also had an effect on the work of midwives in multi-ethnic societies where midwives have had the opportunity to work with parents from diverse cultural backgrounds [35]. Recently, Swedish studies have identified that fathers want

to be involved in care of their newborns [36] and mothers, at the same time, want them to be involved [37].

2.2 THE NEWBORN INFANT

2.2.1 Physiological adaptation processes: breathing adaptation, crying, and breast-seeking behavior

2.2.1.1 Breathing adaptation

Breathing is a centrally regulated, rhythmic and autonomous process generated from the respiratory control center in medulla oblongata and the central nervous system. The control center regulates both breathing rate and volume. Volume varies according to body position, age, sex and metabolic activity [38]. Breathing adaptation to extra uterine life for newborns includes rapid development of adequate ventilation and lung perfusion [39]. It has been shown to take six hours for elective caesarean section babies to establish adequate ventilation and half that time for vaginally delivered infants due to the extended amount of remaining lung fluid in babies born by cesarean section [40].

The gas exchange between air and blood takes place in the alveoli and the tidal volume must be larger than the volume in the airways (i.e. dead space). Negative intra-thoracic pressure during inspiration increases the flow of venous blood to the heart with respiratory rate variations in both central and peripheral flow of the venous blood. The primary regulation parameter for the respiratory control center is the partial pressure of CO₂ in arterial blood. High CO₂ in arterial blood results in hyperventilation due to for example pulmonary distress, metabolic disorders or shunt mechanisms in the heart [38].

Breathing may be influenced by drugs and anesthesia [41]. It has been well known that the epidural analgesia with bupivacaine 0.75% used for the epidural for elective caesarean section depresses the newborn's respiration to the same low degree as general analgesia does with no differences in PaO₂ and PaCO₂ values but with a tendency towards earlier normalization of the initial fetal acidosis [42]. Today however, the dose of bupivacaine has changed to 0.5% and new medicines are available. Ropivacaine 0.75% has been shown to be slightly less potent but similar in pharmacodynamic and pharmacokinetic properties with an equally satisfactory anesthesia. Kampe et al. studied epidural block with ropivacaine and bupivacaine for elective caesarean section: maternal cardiovascular parameters, comfort and neonatal well-being, but did not, however, study the effects of the administration of Ropivacaine on the newborn's breathing, crying or breast-seeking behavior [43]. The breathing in newborns delivered by elective caesarean section might be different from those delivered by caesarean section after a failed trial of labor, resulting in abnormal frequency and apnea episodes [44].

Higher respiratory frequency and lower tidal volume has been explained as an adaptation to higher pulmonary water content to ensure gas exchange with the least effort of breathing. An explanation of the full-term elective caesarean section infants' lower lung volume and compliance was that the lung liquid was not squeezed out mechanically or absorbed as is the case in vaginal birth [45].

It has been shown that vaginally delivered full-term infants showed higher levels of catecholamine than those delivered by caesarean section. However the differences in

metabolic adaptation between vaginal birth and caesarean birth were unexpectedly small [46]. Despite that, it has been clinically recognized that not only premature babies [47], but also term elective cesarean delivered infants, have an increased risk for respiratory morbidity, and for being separated from their mothers and transferred to special neonatal care units [25, 48]. Hence, respiratory distress has been associated with planned cesarean section before a trial of labor [44]. Consequently, researchers have studied the possibility of giving medical treatment before a planned caesarean section for full-term infants in order to reduce the risk of ventilation problems. Treatment has been given to premature infants' mothers to enhance the lung development and/or reduce Respiratory Distress Syndrome for preterm infants [25, 48, 49].

2.2.1.2 Crying

Crying has been assessed as the infant's first language [50] and has been described as part of the dyadic relationship between parent and child: the infant cry and the parent response. Parent response, however, might be affected by factors in themselves or in the context [51, 52].

In clinical practice, the infant's first birth cry has often been associated with the vitality of the infant, communicating a sense of security to parents and staff. However, healthy full-term infants may have adequate lung function following the first breath even without crying [53]. Infant crying was, according to Ludington-Hoe, Cong and Hashemi, an unnecessary condition with physical and psychological costs for the infant and its caregivers [54].

Psychologically, crying has been identified with interrupted interaction between parent and child. Crying also initiates physical stress response in infants [54]. Hence, caregivers have been encouraged to answer infant cries at once, because of the physical stress response effects in newborns. Skin-to-skin care was one main intervention identified as an effective method to prevent and minimize crying [54]. Another interesting identification was that babies exposed to amniotic fluid after birth cried significantly less than babies exposed to the mother's milk odor [55].

Infant crying has also been described as an alarm signal, for example signifying pain or discomfort [50, 56]. During the first hours after birth the "separation distress call" has been recognized as a baby's discomfort cry when separated from the mother, which ceases when the baby is reunited with the mother [57]. Also, infants with disturbed pre-feeding behavior were noted as crying more. This was suggested as being caused by frustration when the instinct to reach the breast was not there, or could not be met due to the separation of mother and child [58].

2.2.1.3 Breast-seeking behavior

Already in the womb, the fetus has the ability to taste, smell and suck. In the third trimester the fetus touches the area around the mouth with its hands [59] in preparation for the first sucking. After vaginal birth without analgesia, babies left alone skin-to-skin on the mothers' breast "crawled" towards the nipple for the first sucking [60]. Sucking and rooting movements started to occur 15 minutes after birth, and reached their maximum level 45 to 60 minutes after birth [61]. Thus, after the first birth-cry and a little rest, the infants put their hands to their mouth and licked or sucked their fingers or hand. Rooting movements started and the babies crawled towards the nipple. Then the babies started doing massage-like movements of the

breast and the nipple with its hands, later licking the nipple and finally sucking. When sucking, the babies' massage-like movements ceased [60].

It has been suggested that the infants' head orientation when crawling towards the nipple may preferentially be promoted by the breast odor that might guide the baby to the nipple [62]. Mizuni et al. concluded that 50 minutes of skin-to-skin contact immediately after birth enhanced infants' recognition of their own mother's milk odor which might have resulted in a longer breastfeeding duration [63].

For decades analgesia, such as pethidin, epidural and/or pudendal block, has been used in women giving birth in Sweden. Hence, Ransjö-Arvidsson et al. [58] studied the effects of maternal analgesia during labor and the effects on infants' pre-feeding behavior, temperature and crying. Analgesia was shown to interrupt or disturb spontaneous breast-seeking behavior, as mentioned previously, and consequently also the mother-infant interaction. Thus, the infants' massage-like hand movements, touching of the areola and nipple with hands, as well as sucking behavior, was less frequent. These infants found the nipple about one hour later than infants with no exposure [58]. However, the labor pain relief medication and delayed early sucking has not been associated with the duration of breastfeeding [64].

For fifty-six breastfeeding mother-newborn pairs, the effects of ultra-low dose epidural analgesia with bupivacaine and fentanyl on newborn breastfeeding behavior showed no statistically significant differences in breastfeeding behavior, either at birth or within 24 hours of birth [65]. Additionally, epidural versus non-epidural or no analgesia in labor did not affect the baby's Apgar score. Long-term consequences were concluded as still unknown [66].

2.2.2 Psychological processes, attachment-bonding, skin-to-skin

The infant's view of the birth experience could be described as a transition from the warm, dark womb to the postnatal environment. Both before and after birth, the full-term fetus/infant is an individual with sensory ability and learning competences with the ability to listen and recognize the parents' voices, recognize heartbeats, music and feel comfort, as well as pain [59]. The newborns also found their way to the nipple, fully prepared for socialization in the first hours after birth, with the ability to see the faces of parents and to repeat the expressions of parents [67].

Care practices that promote natural birth were recognized as care where the baby could stay skin-to-skin with the mother to pre-feed freely immediately following birth. The researchers found that those children cried less, stayed warmer and breastfed earlier than babies who were separated from their mothers. If babies could choose they would probably want to stay skin-to-skin many more hours longer than just the first hours after birth [68].

Attachment to the mother probably starts even before birth [59], and the baby in the alert period, the first hours after birth, communicates with body movements and sounds [17, 67]. The mother also benefits from this communication, which favors her over others, when close to the baby. It has been shown that mothers during the first hours after birth, with the baby massaging and sucking the breast and nipple skin-to-skin, have a release of oxytocin that has been suggested as an element in establishing the mother-infant bonding/attachment [60, 69, 70].

After the first couple of hours, it was seen that the infant often fell asleep for a longer period [67]. During those first hours with the baby skin-to-skin, the warmth, touch, odor, sucking, possible milk ejection and pulses of oxytocin might promote a feeling of calm for the mother and baby, an all-inclusive mediating social interaction, bonding and attachment. Hence, a positive, long-lasting trend of comfort [71] might explain prolonged breastfeeding after early skin-to-skin contact, and may remain evident even months after birth [12]. In addition, a more rapid recovery of weight loss has been shown in skin-to-skin infants compared to infants that have been swaddled [13].

Skin-to-skin contact as a caring method may reduce the “stress of being born” for the newborn compared to infants having been swaddled or dressed. Hence, skin-to-skin contact was discussed as being a natural way of counteracting the circulatory stress of being born [72], a stress that, on the other hand, at least soon after birth, might at the same time be beneficial to the infant [25].

Infants cared for skin-to-skin with their mother for one hour immediately following birth were compared to infants that were brought to a nursery. Still, four hours postpartum the infants that had been cared for skin-to-skin immediately following birth slept, and were in a quiet sleep state longer than the infants brought to the nursery. The conclusion of the study’s randomized control trial (RCT) was that skin-to-skin contact enhances adaptive behavior to extra uterine life through the stimuli of calming and soothing [73]. However, a comparison between early and delayed initiation of breastfeeding showed no differences with regard to breastfeeding duration. Early contact and breastfeeding were associated with greater communication between mother and child [74].

2.2.3 The role of the father

Opportunities for fathers to bond have been described as differing in different countries. However, according to a study of non-industrial societies, most cultures and societies have been shown to limit fathers’ participation in connection with childbirth in some way or another [7].

In western countries, the fathers’ role in antenatal care, childbirth and postpartum care changed during the 1970s from being considered as unnecessary part to an essential source of affection for both mother and child. This occurred at the same time that hospitals started to invite fathers into the delivery room [6, 14, 75].

In addition, Klaus and Kennell’s popular concept of “mother-infant bonding” also involved fathers, through parallel observation studies [76]. The father-infant interaction during first contact as skin-to-skin following cesarean section was studied [77] and was found to be similar to mothers’ touching and eye-to-eye contact with the baby [76]. Hence, during the mid-1980s in the United States, there was a belief among fathers that there existed scientific evidence for father-infant bonding when the father had early contact with the child after birth, and that this had a positive influence on the later father-child relationship. However, parental-infant bonding is complex and fathers have been shown to have strong paternal feelings either after having been present at the birth of their child or having the baby just shown to them by staff after the delivery [78]. So, the bonding process had to be cumulative [79], and correlated to various individual skills and needs, gender roles and historical

perspectives [80]. These perspectives were probably correlated to the observed lack of secure bonding in small children in Sweden [81].

It has been suggested that even maternal attitudes affect the father's involvement with the baby in either a supportive or non-supportive way, as "fathering" is correlated to history and culture, including the social and socioeconomic roles that influence worldwide gender roles and care of the newborn infant [6, 82, 83]. Hence, a balanced attitude towards fathers' participation in childbirth was discussed during the 1980s and was seen as important, where fathers' skills, desires and roles should be taken into consideration [80]. In a study by Röddholm, the fathers that handled their infant immediately after the cesarean section touched their infant more in a play situation three months later as compared to fathers that did not have that opportunity [84].

Early care of the newborn infant by fathers was identified as especially important if the birth of the child was complicated with interrupted mother-infant bonding. Ludington-Hoe et al. found that during the first two hours after birth that fathers of premature infants provided warmth and comfort to the baby when the mothers were not available. An early care-providing relationship between father and infant was shown to develop a positive emotional effect in fathers, understood as bonding/attachment between father and child [85].

In addition, early care of the newborn by fathers was important if the experience of mothers in connection with childbirth was disappointing. Cesarean birth has, for example, been associated with less-positive affect towards the baby when none of the parents were able to hold, touch or see the baby after the delivery [86]. Parke et al. concluded after reviewing father-infant interaction literature that fathers played an important role in the early postpartum period. As early as 1979, Parke et al. thought that fathers' potential would be fully realized when there would be cultural support for fathers involvement with their newborn [87].

In 1992, Palkovitz found that first-time fathers in the United States had lost faith in the importance of early father-infant bonding in their transition to parenthood [88]. Thus, childbirth practice has again changed. This loss of faith was recognized at the same time as the "natural childbirth movement" ceased and the cesarean rate increased [14, 89].

Fathers whose children were born by elective cesarean section, experiencing distress, were shown to use more negative adjectives to describe their baby 6 weeks post partum, compared with those whose children were born by vaginal delivery [90]. In addition, fathers have been described as experiencing more baby cry during the first months after birth, when the birth of the child had been a negative experience, involving feelings of helplessness and guilt [91].

2.2.4 Caring routines and separation

Observation and treatment of the newborn in neonatal wards might cause distress in parents. Distress has been recognized as affecting men's attachment to their infants [19], as well as mothers' attachment to their infants. Separation between mother and term-infant due to health problems, such as respiratory distress in the infant after cesarean section, routine care or suspected sickness in mother or/and child, could be identified as main factors associated with disturbed or delayed mother-infant dyad during the first hours after birth. Transferal of the child to neonatal care unit can be

identified as being associated with negative experiences, while women who had co-care on the NICU have been described as being more dissatisfied than mothers in ordinary postnatal care [36].

The mothers described much emotional strain during separation from their baby, even when the child was not seriously ill. When staff left with the baby, mothers experienced that something was torn away from them and they had a desire for closeness with their baby. The mothers experienced anxiousness that the baby might be harmed by the early separation from them [92]. In addition, mothers described that when they were separated from their baby due to complicated childbirth they had difficulty realizing that they had just become mothers. They felt anxious for the baby's health and life. They described their experience as being like visiting a cinema, with unreal feelings of not having given birth. When reunited with the baby they experienced that the baby mediated calmness and relief from the experience of traumatic childbirth [93].

Separation from the child was found to be the most difficult aspect for mothers when their newborn infant was cared for in a NICU [94]. Thus, it has been recognized that cesarean section mothers with longer time to first interaction with their infants had less interaction with the baby the coming days and weeks following the birth [95].

Psychologically, delayed skin-to-skin contact between mother and child and delayed pre-feeding has been described as increasing levels of aggression and fear in mothers [18]. The stress and postoperative pain in mothers after caesarean sections and complicated childbirth may biologically result in delayed maturation and release of oxytocin [71, 96, 97], with possible delay in the bonding process [95]. Consequently, after reunion with the baby following a caesarean section, mothers required both extended time to protect the infant's pre-feeding behavior and extended breastfeeding support to enhance breastfeeding [98].

2.2.5 The role of professionals

Human childbirth, including immediate care of the newborn infant, is a complicated process. Caesarean sections that are safe for both mother and child, including the baby's well-being after the cesarean section have been discussed as a worldwide goal [99]. In many cases of cesarean section, the beneficial effects for the child have been unclear [100]. In 1985, the WHO criteria for acceptable rate of caesarean section in any state of the world was at no greater than 10-15% [29], as previously mentioned. However, cesarean delivery rates continue to increase worldwide and it has become an increasingly common method of birth in western countries [100]. At the same time childbirth practice has also changed with the use of epidural anesthesia, spinal anesthesia, artificial rupture of membranes and electronic fetal monitoring during vaginal birth and with the changed continuity of midwife care for woman in labor [89]. Within their profession, midwives today have been shown to cope with conflicting values. Being "with woman" has been the ideology in guidelines, in policies and education, but when working in institutions dealing with intervention, emergencies and caesarean sections, conflicts might occur, often within the midwives themselves. Midwives have described "with woman" and "with institution" as two co-existing conflicting perspectives [15]. With the "new" medical paradigm newborns have often been separated from their mothers without skin-to-skin contact during part or all of the first two hours [101].

This situation, with higher incidences of cesarean sections in delivery and maternity wards, affects midwives' and doctors' daily work, as well as parents' experiences, and mothers' and infants' health [21]. However, the consequences of elective cesarean birth for term babies have received little attention [25].

In hospitals in Australia, it was reported that skin-to-skin contact between mother and child did not appear to be common practice after obstetric interventions, such as instrumental and surgical delivery, and it was almost non-existent after caesarean births. This might have effects on later contact between parents and child and early initiation of breastfeeding [101, 102].

Care of the newborn infant is a great responsibility for professionals in early postpartum care. A large number of worldwide neonatal morbidity cases occur during that period, according to the WHO, and care of the newborn during the early postpartum period can be seen as a collaboration between professionals and parents in a shared responsibility for the child, with parents supported by staff [32]. According to Rowe-Murray and Fisher, hospital practices associated with obstetric intervention in delivery must in a modified way enable interaction between mother and baby, regardless of the mode of delivery [102].

Providing care for the newborn child in a delivery ward after complicated childbirth, differs from the natural focus on care of the newborn infant previously described in the background section. The question is if the natural focus on care of the newborn infant is even inappropriate after complicated deliveries and cesarean birth [15].

Providing care for the newborn might differ in many ways after a caesarean birth from what we know of care of natural childbirth delivered infants or vaginally delivered infants exposed to analgesia during labor and/or intervention, such as gastric suction after delivery [58, 61]. The indications for cesarean section are today often relative and cultural attitudes towards childbirth might well have changed over the last few decades. Therefore, it might be important today for the woman and her partner to be closely involved in the event of cesarean section [100, 103], including care of the newborn infant, dependent on the mode of delivery.

3 THE OVERALL AIM OF THE THESIS

The overall aim of the thesis was to describe care of the newborn infant immediately after birth, during maternal-infant separation; the father as primary caregiver and the mother's experiences of separation and later reunion with the infant, in order to enhance development of care for the newborn infant during maternal-infant separation.

The five studies comprising the thesis had the following aims:

I - To describe how mothers of premature or sick babies experienced care and their own state of health after birth in postnatal care in a neonatal co-care ward

II - To describe the meaning of a father's presence with his full-term healthy infant, delivered by caesarean section, during the routine post-operative separation of mother and child for care and observation

III - To describe the meaning of the father's lived experiences when taking care of his infant as the primary caregiver during the first hours after birth, when the infant was apart from the mother due to the mother's postoperative care

IV - To examine the effects of skin-to-skin contact on outcome, comparing its effects on crying and prefeeding behavior in healthy, full-term infants born by elective cesarean birth and cared for skin-to-skin with the father versus conventional care in a chair-side cot during the first 2 hours after birth

V - To explore the effect of caregiving models on the adaptation of breathing after elective cesarean section, in term infants during the first two hours after birth

4 METHODS

4.1 DESIGN

Interviews (study **I**, **III**) and observations through videotape recording (study **II**) were used for data gathering when aiming to describe the meanings of lived experiences and the lifeworld. The phenomenological observation study (study **II**) adds to our understanding the unspoken dimensions of lived experiences [1, 104] looked at in study **III**. Giorgi's phenomenological method (study **I**) [105, 106], and Dahlberg's phenomenological approach based on Giorgi's phenomenological method were used for the analysis (study **II**, **III**) [1]. The RCT design with descriptive statistics for the analysis was chosen for study **IV** and **V** [107].

4.2 SETTINGS

In Sweden, approximately 90 000 babies were born annually when study **I** was planned, of whom approximately ten percent were transferred to one of the 40 neonatal wards in Sweden [26, 108, 109]. All participating mothers in study **I** had been cared for at the NICU where six beds for mothers in postnatal care had been introduced during 1998. This concept was unique at that time because it regarded mother and child as an indivisible unit. The criteria for children being placed at the neonatal co-care ward was that the infant was sick or suspected to be sick and/or having a gestation age less than 35 weeks and/or a birth weight of less than 2200 grams. The hospitals involved in the studies included in this thesis have all had a NICU in close proximity to the delivery and maternity units.

Data gathering for study **III** was carried out at two similar district maternity clinics. The clinics catered to 2 500 deliveries per year [26]. The co-care ward mentioned above was located at one of the two district hospitals where later during the investigation period, participating fathers in study **III** were requested to participate during their stay at the maternity clinic.

Study **II**, **IV** and **V** were carried out at a university hospital with approximately 4 500 deliveries per year. Study **II** was carried out in an observation room on the delivery ward. In study **IV** and **V**, the infants together with their fathers were transferred to a nearby maternity unit at the same hospital. After the cesarean birth, the mothers were transferred to the postoperative ward for observation and care for approximately three hours. Thereafter, the infants together with their fathers were reunited with the mothers on the maternity ward (study **II**, **IV**, **V**).

4.3 PARTICIPANTS AND PROCEDURE

Study design, participants and data analysis are presented in Table 1.

Table 1. Overview of study design, participants and data analysis.

Study design	Participants	Analysis
<p><i>Study I</i></p> <p>An interview study with mothers approximately 2 months after delivery, where their lived experiences of postnatal care in a neonatal co-care ward was studied.</p>	<p>Six mothers with different experiences of separation participated.</p>	<p>Giorgi's phenomenological method was used for the analysis.</p>
<p><i>Study II</i></p> <p>An observation study using videotape recording to elucidate the lifeworld of the father, while he was close to the infant after elective cesarean birth during the routine post-operative separation of mother and child.</p>	<p>Fifteen fathers with their infants participated.</p>	<p>Dahlberg's phenomenological approach based on Giorgi's phenomenological method was used for the analysis.</p>
<p><i>Study III</i></p> <p>An interview study with fathers 8 days to 6 weeks after birth, where their lived experiences when taking care of their infant as the primary caregiver the first hours after birth was studied.</p>	<p>Fifteen interviews with fathers were included in the analysis. The fathers had different experiences of taking care of the infant during the first hours after birth while the mother was in postoperative care.</p>	<p>Dahlberg's phenomenological approach based on Giorgi's phenomenological method was used for the analysis.</p>
<p><i>Study IV</i></p> <p>A randomized control trial (RCT) study, using audiotape recordings of the infant's vocalizations, and Neonatal Behavioral Assessment Scale (NBAS) naturalistic observations, comparing crying behavior and pre-feeding behavior in newborn babies after birth by elective cesarean section, cared for either skin-to-skin with its father or in a cot during the first hours after birth.</p>	<p>Fifteen father-infant pairs participated in the skin-to-skin group and fourteen father-infant pairs participated in the cot group.</p>	<p>Mean, Confidence Interval (CI) and the Mann Whitney U test were used for analyzing crying data, comparing the skin-to-skin group with the cot group.</p> <p>Mean, Standard Deviation (SD) and the Mann Whitney U test were used for analyzing NBAS observations.</p> <p>Spearman rank order correlation was used for the relation of the pre-feeding behavior comparing the skin-to-skin group with the cot group.</p>
<p><i>Study V</i></p> <p>A pilot study with RCT design, using selected respiratory variables from respiratory inductance plethysmography (Respirace plus™) recordings to explore the effect of caregiving models on the adaptation of breathing after elective cesarean, in term infants during the first hours after birth.</p>	<p>Seven father-infant pairs participated in the skin-to-skin group and six father-infant pairs participated in the cot group.</p>	<p>Mean, Standard Deviation (SD), Confidence Interval (CI), and the two sample t-test was used for normal distributed data comparing the skin-to-skin group with the cot group.</p> <p>Median, 25th-75th percentile and the Mann Whitney U test were used for skewed data, when comparing the skin-to-skin group with the cot group.</p>

4.3.1 Study I

After permission from the local Ethics Committee and the Medical Superintendent at the children's clinic, a midwife as part of her daily activity on the co-care ward chose six possible participants from a logbook recording infant diagnosis and length of the stay on the co-care ward. It was assessed as important to gain a wide spectrum of experiences from the mothers, possibly gained as a result of the infants' different medical diagnoses.

One test interview was performed with a mother known to me. The interview took one hour, and six participants were deemed sufficient to provide a reasonable amount of data for a phenomenological analysis. After the test interview, the informant emphasized that the preferred place for performing interviews with mothers would be in their own homes. The test interview was excluded from analysis.

Letters outlining the purpose of the study and that participation was voluntary were sent to six mothers after mother and baby had been discharged from the hospital. One week after the arrival of the letter, I phoned the mothers to obtain verbal consent to their participation in the study. One mother declined participation. A seventh letter with the same information as previously described, was sent to another mother, chosen as previously described, in order to reach a total of six participants in study I, and that mother gave verbal consent for participation in the study when I phoned her one week after the letter had arrived.

The mothers were between 25 and 33 years old. Parity varied from being their first to their third child. During the delivery they had had support from husband or/and staff. The mothers had experienced different modes of delivery, for example vaginal delivery, one with vacuum extraction, cesarean section of a non-acute or acute character, as described by the mothers themselves. The infants, three full-term and three premature, together with their mothers, had been referred to the co-care ward from the maternity or delivery ward because the babies needed care for prematurity or observation for suspected sickness or treatment for a sickness, or a combination of any of these situations. The period of time the babies had stayed on the co-care ward ranged from less than 24 hours to more than 4 weeks.

4.3.2 Study II

Fifteen fathers with their infants participated within two hours after the birth of the child. The study was based on fathers and healthy full-term infants born by elective cesarean birth in the 37th-40th week of pregnancy. Cesarean birth was elective due to either breech presentation, contraction of the pelvis, or an earlier cesarean birth. The only specific criterion set for fathers was that they should have knowledge of the Swedish language. Immediately after the cesarean birth the infant was put skin-to-skin on the mother's chest for about 5-10 minutes. In line with routine care at the hospital unit, mothers were transferred without the baby to the post-operative ward for observation and care for about three hours. The healthy infants, along with their fathers, were then reunited with their mother in the maternity ward. None of the infants were transferred to the NICU.

The fathers were between 28 and 38 years old and infants varied from being the first to fifth child. Three fathers were of other nationalities than Swedish. The infants were cared for either in an incubator, in a cot or skin-to-skin on the father's chest. Informed consent was obtained from each participating parent. The day before the cesarean

birth they were informed about the study verbally and in writing and advised that participation was voluntary. All of the parents who were approached accepted the invitation to participate. The parents were also offered a copy of the videotape.

4.3.3 Study III

Six midwives used their working hours for selection and/or informing participants, according to inclusion and exclusion criteria for study **III**. The inclusion criterion set for fathers was that they should have been primary caregivers during the mother's post-operative care following the birth of a healthy, full-term infant. Exclusion criteria were prematurity of the child, an assessed state of ill-health of the child, or estimation that the mother's ill-health would cause anxiety in the father. The midwives identified possible couples who were then provided verbal and written information about the study (study **III**). Informed written and verbal consent was obtained from the fathers by letters, which were sent to me. Two test interviews, one at the university and one in the informant's home were carried out with fathers known to me. The fathers stated the importance of choosing a calm place for the interviews. The test interviews were excluded from the analysis.

After receiving the signed informed consent, I phoned seventeen fathers to make an appointment. One father that had signed the informed content later declined participation due to a stress-related reason. Sixteen interviews were conducted, but one interview had to be excluded due to technical problems with the audiotape recorder.

The fathers were between 28 and 54 years old, and the child ranged from being their first to their fifth. During the pregnancy they had participated in antenatal education for parents-to-be, offered by the maternity health service. The father took care of the child as the primary caregiver for a period spanning from a minimum of 1 hour to a maximum of 7 hours after birth. The infants were cared for either skin-to-skin with the father, wrapped in cloths or dressed in clothes when cared for on the fathers' chest, in his arms, or in a cot. Before reunion with the mother, all participating fathers, except one, took care of the child in a room, a kitchenette or a day room at the delivery ward or the maternity ward. One infant, along with its father, was transferred to the NICU from the delivery ward directly following the delivery for care and observation.

4.3.4 Study IV, V

Thirty-three parent couples were verbally informed of the study the day before the cesarean section and informed written consent was obtained from thirty parents before enrollment. Three parent couples declined to participate, one for religious reasons, one because of language difficulties and one as a result of previous experience of mother-infant separation. Thirty full-term infants were randomly assigned using sealed, opaque envelopes immediately after the cesarean section to either be assigned skin-to-skin with the father or to receive conventional care in a cot next to the father.

Before data registration began, one father with an infant randomly assigned for the cot group declined further participation in the study because he wanted to be "skin-to-skin" with his infant. This father-infant dyad was therefore excluded from further analysis since no data was gathered.

Two infants were transferred to the neonatal intensive care unit for medical reasons before data collection was finished. One infant in the cot group was transferred 82 minutes after registration began because of high heart rate, and one infant in the skin-to-skin group was transferred because of hypoxia 60 minutes after registration began. Data gathered from these two infants is included in the analysis. The medical diagnosis for both infants was prolonged pulmonary adaptation and they were reunited with their mothers on the postnatal ward one day and four days, respectively post partum. Thus, data was collected from fifteen father-infant pairs participating in the skin-to-skin group and fourteen father-infant pairs participating in the cot group (n=29). Demographical data are shown in Table 2.

Table 2. Demographic data for participants in study IV presented with Standard Deviation (SD) and p-value (p).

Demographic Data	Skin-to-Skin Group	Cot Group	p
Infants			
Sex	9 girls, 6 boys	8 girls, 6 boys	-
Mean birth weight (g)	3,173 (SD=560)	3,449 (SD=408)	0.06
Gestational age (wk)	38.7 (SD=0.99)	38.8 (SD=0.87)	0.74
Apgar score at 5-10 min	9-10	9-10	-
Mothers			
Mean age (yr)	33.1 (SD=5.4)	33.1 (SD=4.3)	0.81
Average parity (number)	2.4 (SD=1.1)	2.2 (SD=1.1)	0.51
Fathers			
Mean age (yr)	34.7 (SD=5.9)	36.2 (SD=6.7)	0.48
Average own infants (number)	2.7 (SD=1.3)	2.3 (SD=1.4)	0.22

Immediately after the cesarean delivery, the umbilical cord was cut and the infant was then wrapped in two towels and shown to the mother. Thereafter, the child was taken out to an open incubator, was wiped off, and if needed, oral suctioning of mucus from the mouth was performed. Then, as soon as possible, the child was returned to the mother in the surgery room and placed on her chest, still wrapped in towels. During this procedure the father was near his child all the time. After being on the mother's chest for 5 to 10 minutes, the infant was transferred to a nearby maternity unit together with the father while the mother was transferred to the post-surgery ward for observation. During the intervention time, infants were either cared for in a conventional way in a cot, with their father present in the same room sitting on a chair beside the cot (n=14), or cared for skin-to-skin on their father's chest, while he was comfortably seated in an armchair (n=15). The fathers in the skin-to-skin group and the cot group received the same information except that the fathers in the cot group were instructed not to pick up the child from the cot. The fathers were free to get to know the child as they would "naturally" do. The fathers could freely console them when they thought this was necessary. After the intervention period lasting no longer than from 30 to 145 minutes after birth, the fathers in both groups were free to interact and pick up their infants as they wished while waiting for the mothers to be reunited with their infants.

Two blankets covered the infants placed skin-to-skin with their fathers, whereas the infants kept in a cot were wrapped in two blankets. The first scoring of infant behavior was made immediately before the microphone was attached and the

audiotape recording of the infant vocalizations began. Out of all randomly assigned father-infant dyads participating in study **IV**, thirteen infants were monitored with Resptrace plus™, seven infants held skin-to-skin on the fathers' chest, and six infants cared for in a cot. The sample size was deemed sufficient for a pilot study (study **V**). Demographical data for study **V** is shown in Table 3.

Table 3. Demographic data for participants in study *V* presented with Standard Deviation (SD) and *p*-value (*p*).

Demographic Data	Skin-to-Skin Group	Cot Group	<i>p</i>
Infants			
Sex	2 girls, 5 boys	4 girls, 2 boys	-
Mean birth weight (g)	3,065 (SD=147)	3,632 (SD=302)	0.01
Gestation age (wk)	38.2 (SD=0.49)	38.9 (SD=0.9)	0.10
Apgar score at 5-10 min	9-10	9-10	-
Mothers			
Mean age (yr)	37.1 (SD=3.5)	33.0 (SD=3.8)	0.66
Average parity (number)	2.71 (SD=1.11)	2.67 (SD=1.37)	0.95
Fathers			
Mean age (yr)	38.7 (SD=4.8)	31.4 (SD=6.7)	0.48
Average own infants (number)	2.5 (SD=1.4)	1.4 (SD=2.1)	0.32

Upon arrival at the maternity ward, after the first scoring of infant behavior, the Resptrace plus™ transducers for collection of respiratory data were fixed in position on the ribcage and abdomen and then connected to the computer; otherwise the procedure was the same as described above (study **IV**).

4.4 DATA COLLECTION

4.4.1 Interviews (study **I**, **III**)

Interviews with the mothers and the fathers (study **I**, **III**) were conducted after mothers and infants were discharged from institutional postnatal care (study **III**), or after their baby had been discharged from the hospital (study **I**). The participants in study **I** were interviewed in their homes approximately two months after delivery. The time mother and child had been at home after discharge from the hospital therefore differed depending on the infant's health and growth. An openness to meet the informant's wishes was regarded as important in order to create a good interview situation in which the informants' would share their lived experiences. The mothers in study **I** found it easiest to partake in the interview situation in their own homes, thus making it easier to cater to their own and their newborn's presumed needs. In study **III**, interviews with fathers took place 8 days to 6 weeks after birth of the child and they were free to choose the place for the interview; some fathers chose their homes while others preferred the room that was booked beforehand at the university. Some fathers wanted an early appointment while they were on parental leave during the first 10 days after the baby was born, others wanted to wait due to their family and work situation.

In study **I**, each interview, except for one, lasted about 60 minutes, and in one case 30 minutes. The participating mothers were asked to talk about their experiences of co-care, describing what had happened to them. *"Tell me about your experiences of co-*

care” and *“Tell me what happened to you”*. The mothers were encouraged to narrate freely and they were eager to share their experiences. The interviewer sometimes interposed to ask clarifying questions, such as *“Could you please tell me more about....?”* Each interview was audiotaped and transcribed verbatim.

Fifteen open interviews with fathers were included in the analysis of study III. Each interview lasted from 45 to 90 minutes. The participating fathers were asked to tell their story of what happened, *“Please, tell me about your experience of taking care of your baby during the first hours after birth when mother and child were apart. What happened?”* and *“Why did you take care of your child?”* The fathers narrated freely and the interviewer imposed questions, such as *“How did you feel then?”* and *“How did you think then?”* The audiotape recordings were transcribed verbatim with marks for silence, hesitation, laughs and other expressions. Each transcript was then number coded.

4.4.2 Videotape recording (II)

Videotape recording was chosen because it included both non-verbal and verbal information. In a phenomenological sense, Merleau-Ponty conveyed the idea that through our vision we go to the things themselves. The meaning of the fathers’ presence could then be investigated on the television screen and described from the depths of the fathers silence [2].

Videotape recording started 20-30 minutes after the birth of the child during the fathers’ and the infants’ stay in an observation room on the delivery ward, and continued for about 90 minutes thereafter. The camera was set in a fixed position and was focused on the father while he was close to the infant. Focus for data collection was concentrated on the non-verbal and verbal expressions. All participating fathers were informed beforehand that a nurse would come in to check the infant and that the father could call the staff any time. Fathers were told that they would be kept informed about the mother’s health. The level of care was therefore the same for all fathers, but the amount of interventions varied during videotape recording. The amount of time fathers were alone with their infant also varied, as a result of nurses coming to observe infants or of fathers calling for nurses. Time taken to provide information about the partner/mother was similar in all cases.

Before starting the data gathering, and in order to assess dependability, two observers (KE and IF) looked through some sequences in order to agree about what should be observed, transcribed or excluded from the recorded material. Videotape recorded sequences when staff were present, speaking to the father or informing him of the mother’s health, were excluded from the data material. It was considered important that fathers were alone with the infant without disturbance in order to ascertain the meaning of the father’s presence. Other sequences excluded were those times when staff observed, touched or spoke to the infant, but sequences when the fathers’ attention was again focused on the infant following these disruptions, were included. Each videotape recording was coded and carefully viewed minute-by-minute and each was replayed several times at full or slow speed in order to capture every non-verbal and verbal sequence. Each verbal and non-verbal sequence was transcribed verbatim. The fathers were not interviewed, but some fathers used words as expressions, and those were transcribed. Sequences when fathers were just there with the infant without any interaction between the two of them were marked as such. The transcribed material contained 30-60 minutes from each videotape recording.

4.4.3 Naturalistic observations and audiotape recording (study IV), and respiratory monitoring (study V)

The naturalistic observations, audiotape recordings (study IV) and respiratory monitoring (study V) were made during the fathers' and the infants' stay in a separate room at the maternity ward during the mothers post-operative care and before reunion with the mother.

4.4.3.1 Naturalistic observations (study IV)

During the intervention time, infants were either cared for in a conventional way in a cot, with their father present in the same room and sitting on a chair beside the cot (n=14), or were cared for skin-to-skin on their father's chest, as he was comfortably seated in an armchair (n=15). The Neonatal Behavioral Assessment Scale (NBAS) observations were conducted from 30 minutes to 145 minutes after birth for the skin-to-skin group with a total number of 91 naturalistic observations for each observed behavior. For the cot group, the naturalistic observations were conducted from 30 minutes to 139 minutes with a total number of 83 observations for each observed behavior. The NBAS was developed by Brazelton and Nugent and was published 1973, and has since then been used for research purpose, with a 90% inter-rater reliability level when used by a trained examiner, according to Brazelton and Nugent [110]. The trained observer (AD) had a long experience of naturalistic observations in advanced clinical settings and research practice of observing and coding behaviors of preterm and full-term newborns. She was a certified examiner in the Newborn Individualized Developmental Care and Assessment Program [111] qualified in 1994 at Harvard Affiliated Teaching Medical School. Before the naturalistic observations began, the principal investigator (KC) and the trained NIDCAP observer (AD) made NBAS observations until inter-observer agreements were established.

During the naturalistic observation of the infant, the observer (AD) scored for each infant the predominant behavioral expressions of wakefulness, rooting reflexes and sucking movements observed during the first minute of every 15-minute period throughout the study period. The tool used was based on the scoring criteria described in the NBAS, with some modifications concerning the infants' state. The rationale for the modifications derived from the fact that the state of the newborn infant could shift quickly. Therefore, in the present study, the two sleep states of the NBAS, 1 and 2, were collapsed into "sleep states" (code 1). The state "drowsy" was unmodified from NBAS (code 2). The NBAS "awake" states, 4 and 5, were collapsed into "awake states" (code 3). The state "crying" was derived from NBAS's "awake" state 6 (code 4). In the present study, an addition to the NBAS definition of crying was made in order to clarify the distinction between crying and fussing; our new definition included the necessity of seeing the typical crying face with "cupped tongue". This specific behavioral expression was described and defined in the Distress Scale for Ventilated Newborn Infants [112]. The infant's rooting reflexes and sucking movements were registered in a protocol according to NBAS [110] every 15 minutes during the naturalistic observation period.

4.4.3.2 Audiotape recording (study IV and V)

In addition to the naturalistic NBAS observations, the infant's vocalizations were measured in order to analyze the duration of infant crying and lent weight to the study design. The audiotaped vocalizations could be seen as an objective instrument. Before the audiotape recording began, the event of crying in the audiotape recorded material

was defined as intense crying without time limit. The microphone was placed 10 centimeters from the infant's mouth at the outermost towel covering the infant. Data was registered in relation to time after birth from 35 minutes after birth and ended no later than 135 minutes after the infant was born, for both the skin-to-skin group and the cot group.

Another nurse, not involved in the naturalistic observations, analyzed the audiotapes with the infant's vocalizations, which could be seen as a validity aspect in the study. The principal investigator (KC) made inter-observer agreements with the nurse who, after agreement was reached, analyzed the audiotapes. Reliability was tested comparing two individuals' judgment, both listening, without knowing in which group the infants were cared for [57]. The audiotapes were divided into 5-minute periods and crying time in seconds was analyzed for each period. For the skin-to-skin group, the total number of 5-minute periods was 221 and for the cot group the total number of 5-minute periods was 162, all infants included.

4.4.3.3 *Breathing registration with Resptrace plus™ (study V)*

For breathing registration measurements, respiratory inductance plethysmography with standard calibration was used for respiratory monitoring collecting respiratory breath-by-breath data [113]. The total time spent measuring electrographic waveforms with Resptrace plus™ was 18.43 hours, from a minimum of 35 minutes after birth to a maximum of 145 minutes after birth. For the infants in the skin-to-skin group, the total time monitored was 9.66 hours and for the cot group the total time was 8.77 hours. No significant statistical difference was shown between lengths of time measured in the two groups. Output streams providing raw breath data from waveforms provided by Resptrace plus™ were received by the © RespiEvents for Resptrace, version 4.2e software for display in order to analyze and present breathing patterns. A computed coding tool prevented data that could have been corrupted within the recording system from being presented in RespiEvents software.

The six chosen respiratory inductance plethysmography variables in the present study were *Breath Frequency* (Br/M), *Breath Volume* (Vol), *Ratio of Peak Inspiratory Flow to Mean Inspiratory Flow* (PIFMF), *Ratio of Peak Expiratory Flow to Mean Expiratory Flow* (PEFMF), *Time Constant* (TC) and *Expiratory-Inspiratory Asynchrony Index* (E-IAI). *Breath Volume* was the volume of each breath in milliliters. The value was not corrected for body weight. *Breath Frequency* was the frequency of breaths per minute, computed on a breath-by-breath basis. *Ratio of Peak Inspiratory Flow to Mean Inspiratory Flow* was the shape of the inspiratory flow waveform and was reflected by the ratio of peak inspiratory flow to mean inspiratory flow. *Ratio of Peak Expiratory Flow to Mean Expiratory Flow* was the shape of the expiratory flow waveform as reflected by the ratio of peak expiratory flow to mean expiratory flow. Both values explored the amplitude of breathing movements and could indicate obstruction or asynchrony with regard to inspiratory and expiratory movement. The *Time Constant* of the respiratory system was a product of lung compliance and airway resistance. It reflected how quickly the lungs could exhale after having been inflated. *Expiratory-Inspiratory Asynchrony Index* quantified differences between the rate of movements of the ribcage and the abdominal compartment during expiration and inspiration.

Inclusion criteria for the analysis of respiratory inductance plethysmography measurements included successful respiratory monitoring of both the ribcage and the

abdominal transducers. Exclusion criteria were unsuccessful measurements of either the ribcage, the abdominal transducers, or both [114].

4.5 DATA ANALYSES

4.5.1 Study I

Giorgi's phenomenological method was a step-by-step analysis involving rich description, reduction through reflection and the search for higher-level invariant meanings. Giorgi's method was detailed and assessed as useful especially for short narratives. He emphasized that the researchers should stay close to the original data and restrain their pre-understanding. Reduction or bracketing was an important part throughout the process [105, 106, 115].

The method comprises four steps: 1) grasping a sense of the whole, 2) discrimination of meaning units, transforming everyday expressions into professional language and 3) synthesizing transformed meanings into a descriptive structure, and 4) the final descriptive structure which combined the meaning of data as an essence [105, 106].

In the first step, the sense of the whole was captured while I open-mindedly read the transcriptions in order to gain a broad sense of the mother's experiences. I tried to be aware of any assumptions that might have been taken for granted in order to avoid premature explanations. This was a naïve reading, in which co-care, feelings and needs were identified.

In the next step, the text was divided into meaning units in the course of a more thoughtful reading. The text as a whole was carefully looked through to capture every word that should be included in the analysis and described as meaning units, directed towards the certain perspective in the text being studied. In study I, the particular perspective studied was text that captured how mothers experienced care and their own state of health after birth in postnatal care. The meaning units were part of a sentence, a sentence or paragraph with a chosen perspective, focusing on the phenomenon.

Each meaning unit was a variation of meaning that differed from the other meaning units' formulated meanings. A sentence or longer paragraph was reflected upon, using free imaginative variations when the text in each meaning unit was transformed and formulated into professional language in an attempt to shed light on the mothers' experiences. This transforming of the text was finished when variations of descriptions in the meaning units shed light on the meaning of the mothers' experiences.

In the next step, descriptive structures were formed of the mothers' experiences, of the mothers' needs and feelings: *"To be able to be close to your baby"*, *"Not to be able to be close to your baby"*, *"To be seen"*, *"Not to be seen"*, *"To be part of a functional team"*, and *"Not to be part of a functional team"*. In the last step the general structure of the mothers' needs and feelings was described in the essential meaning of the phenomenon as *"The mothers' strong desire to be close to their baby"* and was presented when the meaning no longer varied in or between the structures. The analysis was a process of a dialectic encounter between the authors. An overview of the analysis in study I is presented in Table 4.

Table 4. Overview of the analysis in study I.

Grasping a sense of the whole	Discriminating meaning units	Transforming everyday expressions into professional language	Synthesizing transformed meanings into a descriptive structure of the phenomenon
Co-care, part-care, feelings and needs were recognized	<i>“When I was on the co-care ward I didn’t experience the same separation as when the child was on the co-care ward and I was still on the maternity ward”</i>	<i>“To be able to be close to your child”</i>	The essence of the mothers caring and health experience was <i>“The mothers’ strong desire to be close to their child”</i> The essence affected how the mothers experienced their state of health and their experience of being mothers

4.5.2 Study II, III

The overall aim of lifeworld research is the description and elucidation of the lived world, to expand our understanding of human experience [1]. Dahlberg’s phenomenological approach based on Giorgi’s phenomenological method was used for the analysis. The implemented approach of Giorgi’s method [1, 105, 106] was aimed at helping researchers to deal with an extensive amount of text [1] and this approach was used for the analysis of data in study II and III.

A phenomenon is something that reveals itself to consciousness and a phenomenological approach is an attitude of consciously suspending any assumptions to allow a phenomenon to reveal itself to consciousness. It includes the phenomenologist as well as the phenomena. It was emphasized that the researcher should have an open mind throughout the process to be sensitive to changes in meaning [1, 116]. It was an approach described as a movement between whole-parts-whole. It was regarded as important to get a sense of the whole before starting to examine the parts, seeing the contours like a landscape at a distance before examining the parts. This was the naïve reading before focusing on the parts, the so called meaning units.

The sense of the whole after several naïve readings in study II was that the fathers observed any crying from the infants and their movements, and then responded nonverbally and/or verbally, or not at all, in relation to the infant. The sense of the whole in study III was that the infant’s father experienced a range of feelings when he took care of the child. To describe the meaning units everyday language was used in order to avoid theoretical explanations.

When moving back and forth through the entire material reflecting over variations of meanings, differences and similarities, situations were observed when infants expressed themselves to their fathers and the fathers responded in different ways (study II). Moments of silent, shared presence were also observed when moving back and forth through the entire material in order to understand patterns. In study III, it became apparent that the lived experiences of the fathers were directed towards their own situation, their child and the mother.

Variations of meanings as parts of the entire material were linked together and grouped into clusters of meaning. Five clusters emerged in each study (II and III). In study II the first, *“Being with the child”* was a prerequisite for the father’s care of the child. This involved the fathers being ready and close by, or at a distance from where he was readily available to take responsibility for the child. In the cluster *“Feelings and emotions”*, the fathers showed their feelings and they came close to the child. In the cluster *“Interplay between father and child”*, the children’s crying and activity prompted the fathers to take the child to themselves. They kept eye contact with the child and communicated with their child about family, the future and the child’s ability. The cluster *“Father’s support for the infant’s well-being through body contact”* involved consoling through skin-to-skin contact when the child was crying. The father caressed the child’s head, body and cheek until the child calmed down or became agitated. The final cluster, *“Father’s non-supporting activities”*, contained situations where the fathers did not console or support the child or did not try to make the child stop crying. They did not interpret or understand the child’s expressed need. In study III the five clusters that appeared were *“To experience sympathy with the child”*, *“To experience concern about the child and the mother”*, *“To experience roller coaster feelings”*, *“To experience trust and vulnerability”* and, finally *“To experience thoughts about life and the future”*.

In the next step, reflections on variations and similarities between the clusters made the general structure of invariant meaning between the clusters to emerge. The meanings were collated and synthesized, describing the general structure, illuminating the essence of the phenomenon. The essence that emerged in study II was the process of the father taking the child to himself and the essence in study III was the fathers’ lived experience of alterability towards togetherness between father and child. The meanings that constituted and emerged the essence from the general structure of meanings on a lower level of abstraction were identified. The meaning constituents were *“emotional wave”* and *“action wave”* in study II. In study III, the meaning constituents were *“balancing alienation”* and *“ambiguity of ability”*.

4.5.3 Study IV, V

All calculations were made using the statistical software package SPSS®, version 11.5 [117]. The Mann-Whitney U test (the Rank Sum Test), a non-parametric method for ordinal data, was used to analyze the differences between the skin-to-skin group and the cot group. The test was a test of equality of two populations and was an alternative to the two sample t-test for continuous variables (study IV, V), used when appropriate.

Mean, standard deviation (SD) and confidence interval (CI) were chosen as statistical tests in study IV, comparing the skin-to-skin group with the cot group. Mean and CI were used for analyzing *crying data*. The variables were approximately normally distributed according to the QQ-plot. Mean and SD were used for analyzing the

naturalistic observations based on the NBAS items. The variables were skewed according to the QQ-plot. The statistical tests were chosen in order to make it possible to compare the results with previous studies of the same size, where the same descriptive statistics were used [57, 61, 118, 119].

In study V, mean, SD, CI, and the two sample t-test were used for normal distributed data. Median, 25th-75th percentile and the Mann Whitney U test were used for skewed data, comparing the skin-to-skin group with the cot group. There was skewness of data according to QQ-plots of Breath Volume, Ratio of Peak Inspiratory Flow to Mean Inspiratory Flow, Ratio of Peak Expiratory Flow to Mean Expiratory Flow, Time Constant and Expiratory-Inspiratory Asynchrony Index. Median and quartile were therefore used as statistical tests in study V. Statistical significance was set at 0.05, CI \pm 95%.

Study V was too small to make a power calculation. However, power was calculated on observation level in study IV. There was a likelihood of 80% of being able to detect a given size on observation level, if there was a difference. The comparisons between the cot-group and the skin-to-skin group resulted in no demographic differences of importance between the groups (study IV, V).

A univariate analysis was followed by a bivariate analysis where the skin-to-skin groups were compared with the cot groups (study IV respectively V). Study IV variables: wakefulness, rooting pattern, sucking activities (Table 5) and cry, and respiratory inductance plethysmography breath-by-breath variables (Table 7) (study V), were included in the bivariate analysis, all data inclusive. Spearman's rank order correlation coefficients presented in the result section in the present thesis, was used to relate data from study IV on the ordinal level (Table 6) [107, 120, 121].

The Spearman rank order correlation (Table 6) has been included in the manuscript sent to referees and was excluded due to lack of space in the journal, but is presented here to present the relation for the coordination of pre-feeding behavior and skin-to-skin care in study IV [121]. This was to strengthen the results concerning the opportunity for fathers to help the baby coordinate its pre-feeding behavior when cared for skin-to-skin with its father.

4.6 ETHICAL CONSIDERATIONS

The ethical guidelines for nursing research in the Nordic countries were adhered to [122] and permission for study I was obtained from the Mälardalen University Ethics Board, and the permission for study III was obtained from the Uppsala Ethics Board, Dnr 2006-149. For study II, IV and V, ethical permission was obtained from the local Ethics Committee at the Karolinska Hospital, Dnr 96/223 and Dnr 591/97.

The appropriate time to give information to fathers on the delivery or maternity ward (study III), depended on the situation for each participating father and it was regarded as important to avoid information at an inappropriate time addressed to his unique experiences as a father. When informants chose to withdraw participation, they were met with great respect for the vulnerable situation they went through as parents. This was also considered in the interview situations. The interview participants themselves chose what to bring up, although it sometimes brought back difficult feelings. For the mothers, a psychologist was at hand to help if needed. One participant used the help from a psychologist (study I).

The situation of the newborn infant was considered in the planning of study **IV** and **V**. The infants were to be randomized either to conventional care in a cot with the father taking care of the baby or to skin-to-skin care with the father, both caring alternatives were from ethical perspective assessed as beneficial to the infant. In addition, naturalistic observations, audio- and videotape recordings, as well respiratory monitoring by plethysmography was assessed as non-harmful direct and indirect observation methods that would not harm the infant, but would give valuable information to possibly enhancing improvement of care for infants during maternal-infant separation (study **IV**, **V**).

5 RESULTS

5.1 THE ESSENCE IN STUDIES II AND III

The essence of a father's being present with his child (study II) yields the very first experience when the father increasingly comes closer to the newborn infant. The children gave the fathers access to their own ability to care, while the fathers interpreted the child's reaction as confirmation of that care. A father taking the child to himself gradually develops in this very first life situation, but the fathers did not come close to the child immediately or in a hurry. The essence of the meaning of a father taking care of his infant when mother and child are apart (study III) confirms the previous essence (study II). The essence of study III was the lived experience of alterability towards togetherness between father and child. This movement towards togetherness meant immediate and gradual alterability within the father himself that made him gradually undertake the responsibility as he got to know his child. This meant that the fathers were not bystanders, but they altered their participation as walking on a path alongside their child. The fathers' experienced alterability when the babies asked for attention and the fathers perceived the babies immediately and successively in an altered experience of time and room in the togetherness.

The essence of study II went further in revealing an ebb and flow variation in the fathers' involvement with the child. There was an ebb and flow between becoming a father and a physical withdrawal from being a father, rather than immediately taking the practical approach of becoming a resource for the infant. In this ebb and flow, the fathers temporarily lost their grasp of the child's way of expressing him/herself by crying or moving, and instead the fathers withdrew to a private world. In these ebb and flow motions the fathers were trying to grasp their new life situation and become fathers. There was a change between becoming active in caring for the child and passively being with the child. When being with the child without handling him/her, the fathers were at ease with this level of closeness. In this gradual flow, the fathers tried different caring possibilities until they had interpreted the child's expressions as confirmation of received care.

Study III describes further how they took this path alongside their baby, revealing that they experienced threats of anxiety over the mother's health, the baby's health, and their own distress being alone with the responsibility for the care of their baby. As time passed, threats and distress altered towards confidence within himself and for the baby. To enable themselves to focus on their baby, the fathers actively put negative thoughts and feelings away. While focusing, they perceived that their confidence being able to take care of their child was enhanced and the fathers' anxiety over the mother's and their child's health ceased as confidence dwelled. Everything else ceased to exist when the fathers were focusing, and wanted to focus on taking care of their child. Fathers were satisfied being valuable and sufficient for their child in the togetherness balancing an ambiguous emotional pendulum.

The meaning constituents that constituted and illuminated the essence on a lower abstraction level in study II and III were identified as *emotional wave* and *action wave* (study II), *balancing alienation* and *ambiguity of ability* (study III).

5.2 SKIN-TO-SKIN CARE WITH THE FATHER AFTER CESAREAN BIRTH AND ITS EFFECT ON NEWBORN CRYING AND PRE-FEEDING BEHAVIOR (STUDY IV)

One finding in this study was the positive impact the fathers' skin-to-skin contact had on infant crying behavior. The analysis of the audiotape recordings of the infant's crying (Figure 1) demonstrated that the infants in the skin-to-skin group cried less than the infants in the cot group ($p < 0.001$). Mean crying time ($\pm 95\%$ CI) for the skin-to-skin group was 13.4 (± 3.60) compared with a mean score of 33.4 (± 6.61) seconds per 5-minute period for the cot group. The crying of the infants in the skin-to-skin group decreased within 15 minutes of being placed skin-to-skin with the father. The infants in the skin-to-skin group were comforted, that is, they stopped crying, became calmer, and reached a drowsy state earlier than the infants in the cot group (Figure 1).

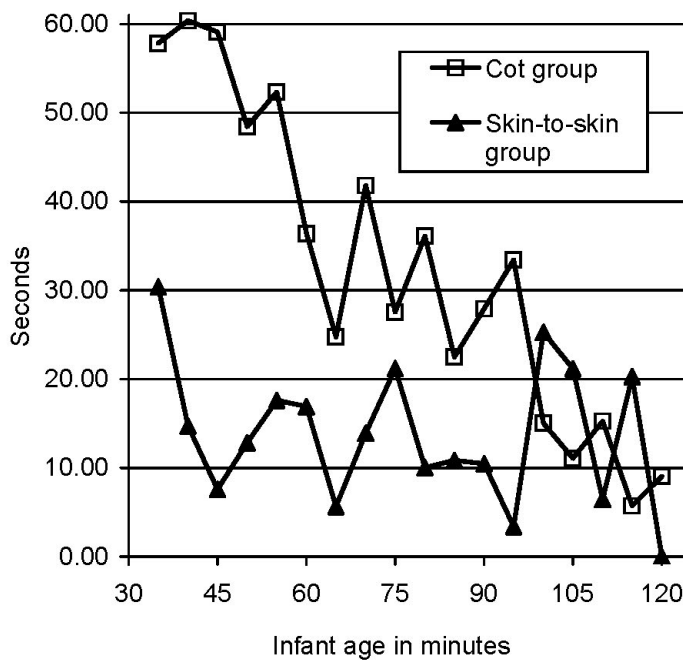


Figure 1. The infant's cry analyzed as mean seconds per 5-minute periods from audio-tape recorded data.

Analysis of the NBAS-based [110] observations (Figures 2 and 3) showed that being cared for skin-to-skin on the father's chest also had an impact on wakefulness. The pattern for wakefulness showed a lower level for the skin-to-skin group when compared with the cot group ($p < 0.01$), as illustrated by the fact that infants cared for skin-to-skin became calm and reached a drowsy state within 60 minutes after birth, whereas the infants cared for in a cot became calm and reached drowsy state within 110 minutes after birth. Therefore, the opportunity for father-infant interaction was presented during the shorter period of calm wakefulness when cared for skin-to-skin, rather than the longer period of wakefulness, which involved more crying when cared for in a chair-side cot. Rooting activity was similar, but higher in the cot group ($p < 0.01$) than in the skin-to-skin group. At 75 minutes of age, infants in both groups showed the lowest level of rooting activities. The skin-to-skin group reached another rooting peak after 105 minutes, whereas the cot group reached a second rooting peak after 90 minutes as shown in Figures 2 and 3. The infants in the cot group showed a steady, medium level of sucking activity, which declined 105 minutes after birth compared with the level for the infants in the skin-to-skin group, which declined within 60 minutes after birth ($p \leq 0.001$).

The summary score for the NBAS-based outcome behaviors over time were based on the naturalistic observations conducted every 15 minutes (Figures 2 and 3). The total mean, SD and p-value for NBAS-based outcome behaviors, wakefulness, rooting and sucking, are presented in Table 5.

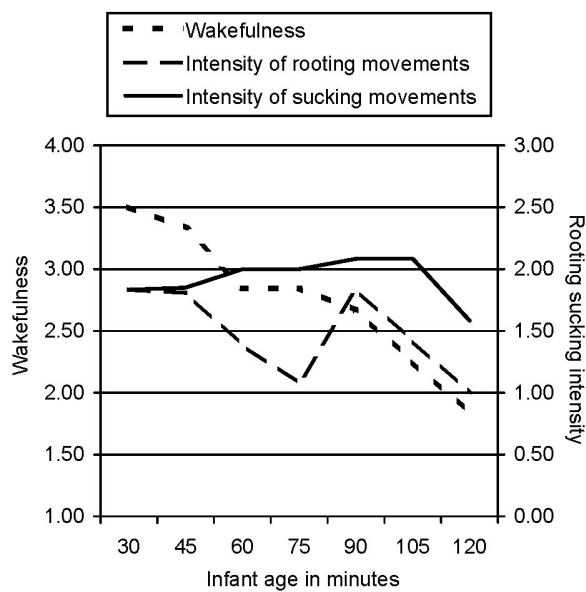


Figure 2. Cot group: the infants' observed wakefulness, rooting, and sucking analyzed as a mean value on the implemented Neonatal Behavioral Assessment-based Scale [110]. Wakefulness codes: 1 sleep state, 2 drowsy, 3 awake, and 4 cry. Rooting and sucking codes: 0 absent, 1 low, 2 medium, and 3 high.

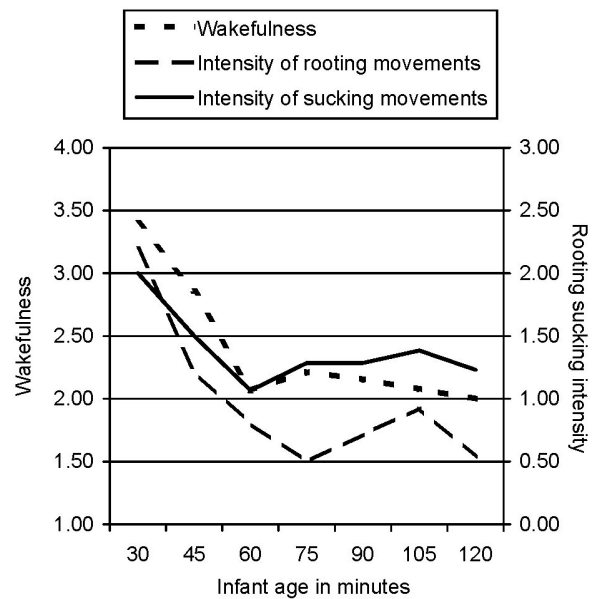


Figure 3. Skin-to-skin group: the infants' observed wakefulness, rooting, and sucking analyzed as a mean value on the implemented Neonatal Behavioral Assessment-based Scale [110]. Wakefulness codes: 1 sleep state, 2 drowsy, 3 awake, and 4 cry. Rooting and sucking codes: 0 absent, 1 low, 2 medium, and 3 high.

Table 5. Total scores for Neonatal Behavioral Assessment Scale-based outcome behaviors; wakefulness, rooting, and sucking shown in mean, SD, p-value [110].

	Skin-to-skin Group		Cot Group		p
	Mean	SD	Mean	SD	
Wakefulness, codes 1- 4	2.24	1.17	2.69	1.07	0.009
Rooting pattern, codes 0 - 3	0.86	1.28	1.46	1.25	0.002
Sucking activities, codes 0 - 3	1.29	1.35	1.93	1.15	0.001

As shown in the Spearman's rank order correlation coefficient matrices (Table 6), high correlation coefficient in the skin-to-skin group was found in the rooting-wakefulness, sucking-wakefulness and sucking-rooting ($r_s=0.64 - 0.63$) variables. The relations in the cot group were highest in the rooting-wakefulness and sucking-rooting variables ($r_s=0.48 - 0.437$). This is shown through the correlation coefficient that was higher in the skin-to-skin group. The relations between wakefulness, rooting and sucking for the skin-to-skin group and cot-group over time are shown in Figures 2 and 3.

Table 6. Spearman's rank order correlation coefficient matrices for the skin-to-skin and cot groups.

NBAS	Wakefulness	Rooting	Sucking	Minutes after birth
Skin-to-skin group:				
Wakefulness		0.64	0.64	-0.28
Rooting			0.63	-0.16
Sucking				-0.07
Cot group:				
Wakefulness		0.48	0.14	-0.48
Rooting			0.437	-0.19
Sucking				-0.01

5.3 CAREGIVING MODELS AFTER CESAREAN BIRTH INFLUENCE THE INFANTS BREATHING ADAPTATION (STUDY V)

The measured data for the infants in the skin-to-skin group and the cot group from the Resptrace plus™ measurements resulted in a total number of 43 884 numeric measurements for the six different chosen variables as shown in Table 7.

Infants cared for skin-to-skin in an upright position had a higher breath frequency (Br/M) 36.6 (SD 39.5, CI $\pm 95\%$ 33.4 - 39.8), compared with 29.1 (SD 30.0, CI $\pm 95\%$ 26.7 - 31.5) for the cot group and median breath volume (Vol) 21 ml/breath, compared with a median score for the cot group of 17 ml/breath (based on standard calibration). The infants in the skin-to-skin group showed a significantly higher breath frequency ($p=0.001$) and breath volume ($p<0.001$) than the infants in the cot group. The higher time constant (TC) in the skin-to-skin group, median 1.4 seconds, as compared with the cot group, median 1.2 seconds, would fit with more compliant

lungs and improved lung emptying for the skin-to-skin infants. This would promote minute ventilation (estimated minute ventilation was 769 ml/min skin-to-skin, respectively 495 ml/min in a cot) and faster adaptation. The improvement was evident despite the finding of more asynchronous breathing (E-IAI) (a median of 1.5 times of asynchrony for the infants in the skin-to-skin group compared with 1.3 times of asynchrony for the cot group), all data included. Mean crying time for the infants in the skin-to-skin group was 4.78 seconds per 5 minutes (SD 13.73) compared to 36.90 (SD 46.38) for the cot group ($p < 0.001$).

Table 7. Result presentation of respiratory inductance plethysmography RespiTrace plus™ variables for the skin-to-skin group and the cot group. Breath Frequency (Br/M), Breath Volume (Vol), Ratio of Peak Inspiratory Flow to Mean Inspiratory Flow (PIFMF), Ratio of Peak Expiratory Flow to Mean Expiratory Flow (PEFMF), Time Constant (TC) and Expiratory-Inspiratory Asynchrony Index (E-IAI).

Variable	Group	Mean (SD)	CI ±95%	p-value
* Br/M frequency	Skin-to-skin	36.6 (39.5)	33.4 – 39.8	0.001
	Cot	29.1 (30.0)	26.7 – 31.5	
Variable	Group	Median	25 th – 75 th percentile	p-value
* Vol ml/br (standard calibrated)	Skin-to-skin	21	14 – 35	<0.001
	Cot	17	13 – 27	
PIFMF	Skin-to-skin	2.1	0.71 – 7.3	<0.001
	Cot	1.5	0.58 – 4.8	
PEFMF	Skin-to-skin	1.9	0.68 – 5.9	<0.001
	Cot	1.3	0.55 – 3.8	
TC seconds	Skin-to-skin	1.4	0.58 – 4.7	<0.001
	Cot	1.2	0.53 – 3.8	
E-IAI	Skin-to-skin	1.5	0.59 – 5.2	<0.001
	Cot	1.3	0.55 – 3.6	

* Estimated Minute Ventilation 769 ml/min (skin-to-skin) respectively 495 ml/min (cot).

5.4 PHENOMENOLOGICAL DESCRIPTIONS (STUDY II, III) RELATED TO QUANTITATIVE DATA (STUDY IV, V)

The phenomenological descriptions below relate to the quantitative data above and were derived from the constituents in study **II** and **III**.

5.4.1 Father's care of his child during wakefulness and sleep (studies II and III)

Initially in the child's presence, fathers would approach the child with a cautious attitude. They met, accepted and took in the sight of their child, passing their hand or

fingertips lightly over the child's head and body. In one recorded episode, the father was observed in this way:

“The infant is calm, open mouthed; its hand is in its mouth. The father caresses the infant's head with the outside of his fingers and with his forefinger he moves on, stroking behind the infant's ear and on the neck. Then he strokes the whole of the ear. He takes his hand away for a while. He puts his open hand on the back and then he strokes the back. The infant is calm. The father takes his hand away.” (Ian)

In this ebb and flow, the child's crying and activity prompted the fathers to become closer to the child. The fathers tried to understand the child's attempt to express itself, verbalizing their understanding of the child's expressions: *“Do you want to sleep for a while now?”* (Levi)

When withdrawing into themselves the fathers fell silent, whispered or spoke in a quiet voice. The fathers, holding their silent child skin-to-skin, sat perfectly still and looked into the distance and one father even slept for a while. During the time of withdrawal, the fathers whispered and spoke quietly, expressing their reflections on being a father: *“Think that I am a father. I am your father. Is it good to be with your father, is it?”* (Otto)

This withdrawal into himself was, for the father, part of a wave of motion leading closer towards gradually taking the child to himself. Moving out in a period of withdrawal, the fathers whispered and hummed songs and tried to gain eye contact with the child. The child took part in the interplay using cries and movements, as when the wakeful child's eyes were open and the arms and legs were moving with slow asynchronous movements while the child's father spoke in a soft, slow, and childlike voice: *“Sweetie-pie you are so sweet, you are so sweet, kiss, kiss, kiss.”* (George) (study II).

The child confirmed the fathers when the baby was calmed by their care, enabling the fathers to take care of their child. The infants' fragile body and helplessness, as well as the infant's eyes, demanded the fathers to take care of the child, enhancing the experience of togetherness. The fathers tried to meet their infant's eyes or tried to be close to their child, when the infants placed no demands on them. For the fathers, it meant waiting for the infant to be ready for togetherness and they experienced themselves insufficient and yet, also at times being sufficient.

Some fathers perceived that the foundation for the father's and the child's togetherness dwelled from the mothers' early handling of the baby. These fathers took care of their child with words, songs and caressing, but they did not hold the child. It was the mothers who first held the baby.

“I started to handle the baby more then, because I felt that now she [the mother] had taken care of the baby first and at that time I could start; and I held him [the baby] in my arms and looked at him and I felt a lot better when both of us had seen him [the baby].” (Thomas)

When the fathers could not read their infant's eyes and movements, they remained passive towards the child.

The fathers experienced that their togetherness with the baby changed over time in the way they talked to their baby. Fathers started to speak out their wonderment over the baby, and as time passed by, they changed their words in telling the baby about their own feelings, anxieties, and topics related to themselves, life, existential thoughts and plans for the future. They shared their feelings with their child, and at the same time they were happy and content that they had reached their goal; a healthy child they had the privilege to take care of. It was also experiencing ransacking themselves and making promises. *“I will give my children tremendous amounts of love so that they will never, ever doubt about it.”* (Phil). To the fathers, the vulnerability of the mother and the fragility of the child meant a threat, sometimes in terms of mistrust for their future life together as a family, and reduced happiness in the togetherness with their child. The fathers calmed themselves when they, with words in their togetherness with their baby, convinced themselves and the baby of a happy ending and reunion with the mother, and their tension calmed down (study **III**).

5.4.2 Father’s care while comforting his crying child (studies II and III)

For the fathers, being together with the child was a slow ebb and flow movement between actions and withdrawal and back again, moving towards an eventual taking the infant to himself. In this wave action, the fathers comforted the child with words and actions. If necessary, they put their own comfort aside. They caressed the child until the child fell asleep. They consoled the crying child by speaking or whispering and/or caressing the child until he/she calmed down. With the father’s hand on the body, the father’s hand-holding or being in a close, skin-to-skin, prone position on the father’s chest, the children stopped crying. *“The father moves the cot. The infant cries more. The father puts his finger in the hand of the infant. The infant falls silent.”* (Bob) (study **II**)

The fathers found themselves to be secure, sufficient, strong and capable of taking responsibility for their child and for taking action on behalf of the infants’ well-being. When they could not, for various reasons, calm the baby by body contact and warmth, they experienced insufficiency. When the fathers experienced that the baby cried out from hunger, they experienced themselves incapable of comforting their baby without the mother’s breast milk.

“I remember that he slept for 40 minutes; then he woke up and it was impossible for me to make him stop crying. I said: “No, this is enough!” I take him with me to the post-operation ward and try to put him on her [the mother’s] breast so that he might suck and become calm.” (Peter)

Insufficiency when taking care of the child involved anxiety for the fathers over hurting the infant’s neck or fragile skin while handling their child with their hands. At the same time, they were the guide and guardian for the child in an experience of being sufficient (study **III**).

5.4.3 Breast-seeking behavior and father's skin-to-skin care (studies II and III)

Being in an episode of withdrawal into themselves, the fathers kept the child from moving towards his nipple, or from sucking the skin on the father's chest:

"The infant moves its head from side-to-side on the father's chest and lifts its head. The father looks at his infant. The father straightens up his body position. Then he changes the infant's position to a prone position. He looks around the room again. The child clicks its tongue. The father removes the blanket from the infant's head and laughing he says, "You won't find much to eat here." (Edward) (study II)

It was cozy and comfortable for the father to be close to his child by himself. While others were more hesitant, some fathers spontaneously cared for their child without consideration of anxiety, staff, other parents, or that the mother was not with them. These fathers experienced the greatness of presence. *"It was, yes... [sigh]...It was a little like the feeling I can imagine that a mother feels when she has given birth and the baby has just been put on her chest...Miraculous." (Bill)*

The fathers experienced being unprepared for a child who crawled and sucked on his breast, and the fathers found it easier than they thought it would be. They found that their infant's smelled their familiar body odor and became snug; at the same time the fathers experienced calmness and tiredness, and that they knew their children better than the mothers (study III).

5.4.4 Father's care while observing his child's breathing (study II)

If the child's breathing was arrhythmic, the child sneezed, twisted or lost his/her position, the fathers stopped other activities and looked at the child and sometimes took action. One child was silent for a rather long period and the father started to shake the child carefully until the child made a move and cried out. He verbalized his observation: *"I can't hear anything... Yes, it's okay!" (Allan)*

The fathers would check the technical equipment and observe the monitors and sometimes they would call the staff:

"The father bends his head, his ear in front of the infant's nose and mouth. He looks at the monitor and bends his head again with his ear close to the infant's nose and mouth. He listens and then he looks at the infant. The infant is silent." (Nick)

The fathers' presence with the child included recurrent experiences in their relationship that took them further in the transition to fatherhood.

5.5 DESCRIPTIONS OF MOTHERS' LIVED EXPERIENCES OF MOTHER-INFANT SEPARATION AND LATER REUNION (STUDY I), AND FATHERS BALANCING ALIENATION AS PRIMARY CAREGIVERS (STUDY III)

The essence of the mothers' caring and health experiences was their strong desire to be close to their baby. They wanted to be close to their baby whatever the circumstances, and to be kept fully informed at all times. The mothers experienced that the organization, staff or other circumstances prolonged the separation from the baby (study I). This is similar to the fathers' experiences being primary caregivers when mother and baby were apart (study III). Balancing alienation for the fathers involved experiencing threat, when they had to wait for the reunion with the mother, and the baby cried out from hunger and was impossible to comfort.

"The staff came to check the baby and the midwife asked, 'How long has the baby been crying?' I replied, 'He has cried since I got my coffee, a couple of hours now'. Soon after that a doctor came to tell me that she [the mother] was about to wake up and was on her way to us [the baby and me], and I felt that now, she [the mother] was soon ready and I could calm down a bit." (Adam)

Alienation from others in the togetherness with the child was experienced by the fathers in a sense of emptiness and longing for the infant's mother in a constant undertone of anxiety, while at the same time having feelings of passion and happiness for the child experiencing the greatness of presence. The fathers together with the child perceived each passing second with their child. The rhythm was calm, the time passed quickly and the fathers experienced that they were occupied by their own feelings, alienating themselves and their child from others while experiencing a readiness to constantly alter their participation. *"It was a very strong feeling that now it was the two of us [father and baby] that should make it, should make sure that the mother became healthy."* (Bill) (study III)

Fathers and mothers experienced time differently from what they had done before (study I, III). The time of separation was, for the mothers, experienced longer than it actually was while separated (study I). The experiences for the mothers were that the baby was in another ward, separated from her and the mothers felt disconnected from the reality of having delivered a baby. They also experienced guilt and that they had abandoned their baby. When the baby was suspected of being sick and in need of observation on the co-care ward one mother expressed herself about the separation between her and the baby;

"I think the staff thought everything went smoothly, the baby came to the co-care ward, nothing was wrong so we both came to the maternity ward. But we were not together. It all went wrong. I regret that I didn't complain, but I was totally in the hands of the professionals." (Margaret)

Other mothers experienced that it was easier to express their need for care when they felt they were seen and understood without words being necessary during the separation from their baby, involving their strong desire to be close to their baby. The mothers needed information repeatedly and to be treated as a unique person in care.

The mothers experienced that a conversation with the doctor about the baby gave the mothers hope during the separation from the child. Mothers wanted to co-operate with the staff and to agree with them as being part of a team when it came to decisions about the baby. Lack of cooperation and information made the mothers experience that they were totally in the hands of the professionals, experiencing a lack of control (study I).

Balancing alienation for the fathers together with the baby (study III) involved alienation within themselves, as well as alienation within women's birthing domain in the hospital environment. During the situation of alienation, fathers' were experiencing uncertainty, not knowing what would happen next, to themselves and the baby, or to the mother, although supported by the hospital staff, always nearby and ready to act, if needed. The fathers sometimes dared taking practical initiatives into their own hands and experienced trust being in the hospital. It also involved experiences of limitation. Their experience of limited ability and lack of framework made them passively being with their child, with a wish to be closer to the child or to dare to take action.

“They showed us [the baby and me] to a room on the delivery ward and then they left and there I sat, in a chair with the baby in my arms. There was a bed in the room but I became unsure, I did not want to disturb. Maybe someone else needed the bed but really I wanted to lie down with the baby on my chest but I kept sitting in the chair. I unfolded the towel wrapped around the baby to be able to see the baby a little more [laugh].” (Jack)

The meaning for the fathers was that at the same time they wanted to be supported and confirmed, they also saw it as a privilege to take care of their child alone. The father's lived experience was that the staff did not always understand that the fathers were a resource for the infant's wellbeing; something they considered themselves to be. To the fathers, a sense of disappointment was experienced when they were not confirmed as fathers; and a sense of happiness when staff and other parents saw them and confirmed them (study III). To the mothers (study I), sometimes staff did not understand their basic need for being together with the child.

When mother and baby were reunited, the mothers sometimes had a sense that they had once again delivered their child. Following reunion they experienced that they had unlimited access to their baby. Some mothers experienced 'bonding' with their baby at the birth, while others experienced 'bonding' when reunited with the baby. How soon a mother could become an independent parent was determined by the amount of time she was able to be close to her baby. After reunion with the baby, the mothers experienced that the staff gave them the chance to 'bond' by having the opportunity to take care of the baby's practical needs. It was also experienced as easier for the mothers after reunion to express their own needs for care. The process of becoming a mother also involved being able to make choices about their baby and themselves in cooperation with the staff. The staff could give them a push in the right direction, which in turn made the mothers experience themselves as an independent parent. At the same time, the staff made themselves redundant. A 'bonding process' that was drawn out over time affected the mothers, their feelings of being a mother, and their health experience. To the mothers, the entire stay at the hospital was regarded as one event that included separation and later reunion (study I).

5.6 FURTHER UNDERSTANDING OF THE RESULTS (STUDY I - V)

The results in the present thesis could be understood as being impregnated with *comfort and approach*, as well as *separation and distress*.

Comfort and approach, with the father as primary caregiver, seemed to be fundamentally human and as good as the mother's care of the infant during situations where the mother-infant dyad had been interrupted immediately following birth. However, this does not mean that the mother-infant dyad should be replaced, but rather be supported by a father's skin-to-skin care, providing comfort and well-being for the infant during mother-infant separation.

Comfort and approach was a description of *giving*, with fathers being the infants' source of comfort and well-being. When the infant was separated from bodily contact, it meant *separation and distress*, with more crying, wakefulness and possibly less breathing adaptation, sometimes meaning *separation and distress* for the father as primary caregiver.

The result as a whole was also a description of *receiving* for both babies and fathers, when approaching each other. While the father cared for his infant he *received* comfort and calmness himself when being present with the baby.

From the mothers' point of view, they described mainly *separation and distress* when mother and child were apart and *comfort and approach* when reunited.

6 DISCUSSION

6.1 RESULT DISCUSSION

The overall aim of the thesis was to describe care of the newborn infant immediately after birth, during maternal-infant separation; the father as primary caregiver and the mother's experiences of separation and later reunion with the infant. The studies in the thesis add what could be understood as phenomenological descriptions of bonding. The descriptions illuminated that from the perspective of the newborn infant, a father's care immediately following birth and during maternal separation is comparable to the mother's care, except that a mother can breastfeed. The care was similar to what was previously found with mothers during the first hours after birth [77, 123]. A caregiving model where the fathers hold their infants skin-to-skin, in an upright position on their chest has a positive impact on the infant's crying, pre-feeding behavior and breathing adaptation. The father's care facilitates the development of the infant's pre-feeding behavior and might enhance the subsequent mother-infant reunion.

6.1.1 Comfort and approach

6.1.1.1 Fathers care of the newborn and mothers experiences of reunion- a phenomenological description of bonding

Recurrent experiences of the child's crying and activity seemed to take the father closer to the child (study **II**). This was confirmed by the fathers in study **III**, where the essence of the fathers lived experiences was alterability towards togetherness between father and child. The fathers' experienced alterability when the babies asked for attention and the fathers perceived the babies immediately and successively. Thus, the fathers in study **II** and **III** seemed to get a lived experience of gradually coming closer in togetherness with the child. This can be understood as a phenomenological description of bonding [67]. The Danish philosopher Løgstrup's view of trust was that of delivering oneself over into the hands of another [3]. This can be understood as the infant delivering itself over into the hands of the father, and the father fulfilling the emotional and ethical demands placed on him [3], as well as the father taking on responsibility for the child.

Fathers described (study **III**) how the infant's fragile body, helplessness and the infant's eyes demanded the fathers to take care of the child and that this enhanced their experience of togetherness. In that way, the full-term infants in study **II** and **III** gave the fathers access to their own ability to care for the baby immediately after the birth (study **II**). Preterm infants' fathers have described it as being more difficult to bond to a premature infant. The experience of unreality was their predominant experience, but a turning point occurred when they felt confident enough to have physical and eye contact with their pre-term baby [124]. The fathers participating in the studies in this present thesis (study **II**, **III**, **IV**, **V**) all had the opportunity to have physical and eye contact with their full-term baby immediately after birth, implying that the description of the bonding process might differ from premature parent-infant bonding [67, 124]. In study **II**, it was the infant itself who triggered waves of closeness. In the emotional and practical ebb and flow experience of closeness to his child, the father's reflections and adjustment could be understood as the bonding process [67]. This can also be related to Løgstrup, who wrote that to gain trust in one another, we have to modify our actions as demanded by the other person [3].

In study **II** and **III**, it can be understood that the fathers showed both passion and sacrifice [125] when they laid aside their own needs to focus on the child. Thus, the fathers in study **II** and **III** put their own comfort aside when they were together with the baby. They caressed the child until it fell asleep. They consoled the upset child by speaking or whispering. They caressed the child until it calmed down with the father's hand on the body, as Marcel [125] wrote that existence includes both passion and sacrifice.

The fathers did not have any medical responsibility while taking care of their child, but they seemed to take responsibility for the child's well-being. This could be related to Løgstrup's [3] view of relationships involving trust, love and sympathy, that there is no impulse to first investigate the character of one another before taking on the demand to care, when needed. The fathers, while taking care of their babies when separated from their mothers, seemed to observe the infant, checked the equipment and, if needed, they called the staff. If the child's breathing was arrhythmic, the child sneezed, twisted or lost its position, they stopped other activities and looked at the child and sometimes acted (study **II**). At the same time, when the father took care of the child, he experienced calmness himself (study **II**, **III**) that could be understood as confidence and trust in the baby and in his own ability (study **III**) [3].

When mother and baby had been separated on the delivery ward, the mothers felt as if they had delivered again when they were reunited with the baby (study **I**). This could be related to mothers' description of reunion with the baby in Nyström's and Axelsson's study from 2002, where the mothers described that love for the baby came through intense closeness, through joy inspired by the baby when mothers had their children with them [92], and the presence of the baby that brought relief from traumatic childbirth experiences [93].

An experience of delayed 'taking the child to themselves' influenced the mothers' descriptions of their own health experiences in study **I**. Some mothers experienced that they 'took the child to themselves' at the time of delivery and others when they were on the co-care ward, depending on time of separation and the varying situations they had experienced. The mothers experienced that the length of time it took to become an independent parent was dependent on the amount of time she was able to be close to her baby (study **I**). This can be understood as bonding developing over time [67]. In addition, it can be related to a mother's description of presence with the baby, mediating calmness and a feeling of accomplishing motherhood [92]. Bonding over time depended on the amount of time the parent was able to be present and close to the baby, and was probably similar for both mothers and fathers [83].

When reunited with the baby, the mothers in study **I** described that they cooperated with the staff and could express their need for care, and they could care for the child in a practical way. They experienced that they were given authority and independence. They could make choices about the baby's care, as well as their own. This can be related to a phenomenological study of women's experiences of complicated childbirth, where the essence was that the mothers had a desire to be recognized and affirmed as a genuine subject [93].

6.1.2 Separation and distress

6.1.2.1 Mothers' and fathers' experiences and infant attachment

One can assume from the results in study **III** that the fathers held themselves back because of the mother's strong desire to be close to the baby. In study **III** some fathers' knowledge of mother-infant bonding was illustrated when they did not hold the baby during maternal-infant separation with the good intention of promoting mother-infant bonding. Probably, the importance of the father's bonding [67] needs to be identified by professionals and parents themselves in situations where the mother-infant dyad is interrupted, because otherwise the baby will not get close body contact, even though the father is present.

The fathers (study **III**) experienced threats of anxiety for the mother's health, the baby's health and own distress being alone with the responsibility for the care of the baby. The fathers' lived experiences could be understood as they experienced themselves omitted from their partner and from staff, and could be understood as separation and distress. This is in line with a previous interview study on fathers' perceptions of the immediate postpartum period that showed that fathers' experiences were related to 'self and others' and that they were sensitive to interaction with their baby in relationships with others in their environment [126]. Thus, mother, baby and father should be, if possible, cared for as a unit. Alienation could be understood as loss of a sense of togetherness [127], with the staff or other parents, within the woman's childbirth domain and the hospital environment, but also when the baby cries and is perceived by the father as impossible to comfort. In addition, crying did not enhance bonding, but rather it interrupted the process [54].

The mother's strong desire to be close to her baby (study **I**) could be understood as bonding [67]. The separated mothers in study **I**, could in addition be understood to show feelings of anxiety because the mothers had a bond to her baby and her ambivalent feelings were feelings of loss for togetherness [18, 67, 127]. This finding could also relate to other studies describing women's experiences when separated from their baby after birth [92, 93]. Mothers described that they felt anxious about the baby's health and for its life. They described guilt after the cesarean birth. In addition, they felt lonely, empty, deprived and worried about the baby. Separation between mother and child during the first week of life was an experience of much emotional strain, even when the newborn was not seriously ill, and the mother seemed to be in need for consolation [127]. One can speculate if the crying infant, when not being cared for skin-to-skin (study **IV**, **V**), has feelings of loss from the attached sense to its mother. Mother and child had already established bonding/attachment to each other during pregnancy [59, 67], and attachment has been described as involving feelings of loss, where fear, ambivalence, anxiety and anger dwelled, if separation from the attached person takes place [18].

6.1.2.2 Caring for a mother separated from her infant and fathers together with their infant

To meet the mother without her baby might be like a meeting with a mother having feelings of unreality about having delivered a child. She might also have a different timetable about what happened. She might have feelings of guilt and that she may feel that she had abandoned her baby (study **I**), as confirmed by other researchers within the field [92, 93].

The mothers in study **I** could be understood to experience that they were alone with their silent desire to be close to their baby (study **I**). This can be related to a previous study of mothers' experiences of being separated from their newborns. When staff went away with the baby, mothers felt as if they had torn something from her [92]. Mothers' and fathers' experiences can be related to Løgstrup [3], who stated that humans through our attitude to other people have the power to make them feel small or large, threatened or secure [3], as illustrated by a quotation in study **I** where a mother experienced that she was totally in the hands of the professionals. It has previously been described that mothers felt that caregivers did not listen and that they felt rejected [93]. This was also described by the fathers in study **III**. The fathers did not always feel as if the staff saw them being resources for their infant's well-being. However, fathers wanted to be involved in care of their newborn postpartum [36].

The mothers in study **I** seemed to trust staff when they experienced that staff understood their strong desire to be close to the child. Trust could be understood according to Løgstrup, as given by the person we are set to care for [3], in this case the mother, as the patient, who is separated from her child. 'To be seen' meant to the mothers in study **I** to be treated as a unique person. This is similar to recent findings in a study on experiences of separation [94]. The essence of the experience of separation was understood as an alternation between two opposite concepts, exclusion and participation, with the emphasis on exclusion. When a feeling of participation dominated, a continuous dialogue existed and the mother was cared for as a unique person with unique needs. This supported her feelings in a positive way. In study **I**, an understanding attitude from staff who kept the mother fully informed during maternal-infant separation seemed to make her feel in control. The mothers previously described in a study that they wanted to feel that they had control over the baby's condition [93]. Consequently, it could be understood that staff, that understood, involved and informed the mother repeatedly about the child and the coming reunion, made the mother feel comfortable in her state of separation and made her feel in control (study **I**).

6.1.3 Comfort and approach or separation and distress

6.1.3.1 Crying, breathing adaptation, pre-feeding behavior and skin-to-skin contact

The main findings in study **IV** showed that the infants in the skin-to-skin group had a rapid decrease of cry within 15 minutes after being put skin-to-skin with the father. They cried less than infants cared for in a cot ($p < 0.001$), which was similar to our findings in study **V** ($p < 0.001$). In addition, our findings in the pilot study (**V**) support a hypothesis that infants cared for skin-to-skin on the father's chest in an upright position have better respiratory function after cesarean birth.

The correlation between rooting, sucking and wakefulness (Table 6) can be understood as when infants being cared for skin-to-skin, during the time they were awake pre-fed with a coordinated pre-feeding behavior. This is seen in Figures 2 and 3, where the rooting pattern in the skin-to-skin group and the cot group were similar, but the skin-to-skin group generally showed a lower level. At about 75 minutes of age, infants in both groups showed their lowest level of rooting activities. The skin-to-skin cared for infants got another weak rooting peak after 105 minutes, while infants cared for in a cot got a second active rooting peak after 90 minutes. New rooting peaks indicated that the rooting peaks will return at times until the baby is either reunited with the mother or becomes tired. The rooting peaks have been recognized as being similar to the recurrent oxytocin releases in mothers shown by

Matthiesen et al. [60], a study that showed when the baby increased massage-like movements during breast-seeking, the oxytocin levels rose in the mothers, and during recurring massage periods similar to the recurrent periods of pre-feeding behavior in study **IV**.

The infants cared for skin-to-skin with their fathers showed lower levels of wakefulness ($p < 0.01$) and became drowsy after 60 minutes. In addition, the infants in the skin-to-skin group showed lower levels of sucking activity ($p \leq 0.001$), the lowest after 60 minutes. Thus, the calm baby cared for skin-to-skin with the father might have had strength for another rooting peak when reunited with the mother, and in such a way, the father's care might have facilitated the infant's first early sucking on the mother's breast following reunion (study **IV**). In contrast, the infants in the cot group showed a steady medium-high level of sucking activities. In addition, the infants in the cot group became drowsy as late as after about 110 minutes. Thus, the babies cared for in a cot might not have the same strength for another rooting peak when reunited with their mothers.

However, the effects of skin-to-skin contact in term newborns are complex, both biologically and psychologically. Mizuni et al. [63] concluded that 50 minutes skin-to-skin contact immediately after birth enhanced infants' recognition of their own mother's milk odor. Some fathers in study **III** mentioned lack of breast milk as setting a limitation of their caregiving activity. However, if mother's milk odor could not be provided by the father; he could provide skin-to-skin contact sufficiently as a mother immediately following birth and during maternal separation. In mothers, skin-to-skin contact and early initiation of breastfeeding are combined. This is not the situation for fathers. However, he can give the infant a chance to coordinate its pre-feeding behavior. In addition, early skin-to-skin contact with the mother has been shown as being important for the duration of breastfeeding, being even more important than early initiation of breastfeeding [128]. In situations of separation, when early skin-to-skin contact with the mother and initiation of breastfeeding is delayed [129, 130], fathers as primary caregivers, from the infants perspective, can provide a calming skin-to-skin contact, an enhanced adaptation of breathing and a chance to pre-feed. The father's skin-to-skin care can facilitate the development of the infant's prefeeding behavior. In any case, when the infant is reunited with the mother after separation, mother and child might require extended skin-to-skin contact and breastfeeding support to enhance breastfeeding [98].

6.2 METHODOLOGICAL CONSIDERATIONS

The appropriate time for conducting interviews (study **I**, **III**) with regard to pre-understanding the mothers' and fathers' situation, could be a topic for discussion. Related to Waldenström's study [131], the interviews in study **I** could have been performed when the mothers felt positive about their birth experience. Waldenström found that mothers became more negative towards their birth experience one year after the birth than they were two months after the delivery [131]. It might have been due to the relief and happiness felt soon after birth of a healthy child, especially after a complicated delivery or cesarean section [132]. However, this might not have been the case for the fathers being interviewed in study **III**. Instead it might have been possible as time passed for the fathers to become more positive towards the birth experience as a whole, because they had had the opportunity to take care of their child after complicated childbirth or cesarean section. In a study of men's stress levels following birth attendance, it was assessed as being possible that raised stress levels

at birth may have an impact on the father-infant bond when they might have felt that they had not fulfilled the role expected of them during childbirth [133]. According to Gerrish and Lacey [107] the appropriate time for conducting interviews could be discussed and in the end would be the researcher's and the informant's choice. The fathers as informants in study **III** were not as bodily affected as the mothers were by the experience of birth, and that would have had an influence on the timing of interview, as well as on the timing for presenting information about the studies (**I**, **III**).

The main difference between an interview situation (study **I**, **III**) and an observation situation using videotape recording (study **II**) was the intersubjective influence that in the interview situation is taking place between the researcher and the participants [1]. In the observation situation the intersubjectivity took place between father and child when videotape recorded. In the interview situation, the informant's words were transcribed, and in the observation situation what was seen and heard on the videotape recordings was transcribed. When doing this, reflections over personal pre-understanding and pre-theoretical knowledge was extremely important because humans, including myself, naturally tend to fill-in gaps in order to make an experience whole [104, 134]. For this reason, a phenomenological observation study through videotape recording requires a skilled researcher. In study **II**, I received confirmation from the co-author (IF), and this can be seen as strengthening credibility of the research process.

The fathers with their babies, in the videotape recordings, lived their lives. They were in their lifeworld and I was in my lifeworld with the television screen as the horizon [134]. During an interview, the informant presented lived experiences to a researcher and the researcher used bridling in the situation to be able to ask the right questions, making the researcher dig deeper into the meaning of the lived experiences [1, 135]. During the analysis processes, I understood what it meant to 'slacken the threads' to the world [104, 134], putting oneself at a distance from the text, and was ready to reflect and let traverse meanings arise, letting a different meaning arise and again trying another traverse meaning [116].

Conscious suspension of assumptions was the way to adopt a reflexive attitude in which one's natural presumptions could be problematized, and traverse meanings could be given to me from the text. This way of reflection took time and could not be forced but it put me closer to an irreducible and given meaning of the phenomenon [2, 116].

Sandelowski [136] pointed out that the researcher, through his/her attitude, tends to maintain the epistemological approach to the treatment of data when shifting the paradigm of inquiry. I studied the epistemology of lifeworld research before conducting the two quantitative studies (study **IV** and **V**). Consequently, the epistemological foundation of lifeworld research was the basis for entering into quantitative research questions. However, regardless of any epistemological foundation, the overall aim is the same for any researcher today with an interest in caring perspectives. The goal is to improve health and care for the patient and their relatives, so that they feel safe and are treated with respect within the health care system [137].

Having the epistemology of the lifeworld approach as a foundation enabled me to remain open and reflective over my pre-understanding and beliefs while analyzing

both qualitative and quantitative data and writing qualitative and quantitative papers (study I-V). It was actually a useful approach when being curious and open about the material that was introduced to me and was also a useful approach when being involved in the interpretation of quantitative data (study IV, V). The use of bridling guarded me from presenting and making interpretations that only reflected my pre-understanding [116].

6.2.1 Issues of trustworthiness and transferability

Trustworthiness is according to Polit and Beck [138], the qualitative study's credibility, confirmability, dependability and transferability. *Credibility* is an especially important aspect of trustworthiness [139]. When reading a paper, it should be possible to follow the reasoning all through the study [1, 139]. I tried to carefully and honestly describe the data gathering, the analysis process and any possible pitfalls in order for the reader to be able to follow the 'red thread' throughout the data gathering and analysis of each study. In study I, for example, the reason for including an example of the analysis process in the paper and quotations from mothers was to introduce the readers to the analysis process and to enable them to judge the trustworthiness of the study for themselves. In study II and III, the analysis process was not presented in tables, but was carefully established in text.

Giorgi [105] wrote about the necessity to distinguish science from other knowledge. He meant that knowledge qualifying as science must be (1) systematic – knowledge that could be related to other knowledge; (2) methodological – could be repeated; (3) general – transferable to other situations, and (4) critical – had undergone peer scrutiny. Giorgi's way of distinguishing science from other knowledge was topic for *credibility* discussions, if the research method engendered the reader's confidence in the research process, its outcome and in the veracity of data [138]. In the phenomenological approach (study I, II, III), the main topic was whether the bridling or reduction had been used in a way that did not threaten the credibility of the research process and findings. During interviews (study I, III) and during the observations through videotape recording (study II) my own experience and knowledge of the phenomena could never be totally disregarded, but at least held back as much as possible, to allow the meaning of the phenomenon to show itself [134]. An example of contribution that enhanced credibility from study III was when my supervisors (KC and IF) read through the fifteen transcripts. Hence, *confirmability* referred to whether the study outcome was derived from the participants or from the researcher's bias. Sandelowski [140] wrote that no method was absolutely strong or absolutely weak, but could be discussed in terms of *confirmability*.

Dependability took into account factors of instability, such as, changes over time [138]. I had dependability in mind when choosing phenomenology as the approach for study I, II and III because lifeworld descriptions would enable the applicability of different periods and different perspectives as being a common ground for all living bodies [2, 104, 116]. Another qualitative method could have been used, but another qualitative method might have presented descriptions that would have been more tied to context or perspectives than the phenomenological description. An example of a consistency test to ensure *dependability* over time was when, six months after the transcriptions were made in study II, I read through the transcriptions again and compared them to the description of the meaning of the father's lifeworld as

described in the study. A part of the videotaped material was looked through again, assuring *dependability* on what had been analyzed half a year earlier.

Transferability was the ability to transfer findings to other settings and groups [141]. The results in study **I**, **II** and **III** can be transferred to other settings and situations that are similar. However, one should be cautious when considering *transferability*, even if the participants are in sufficient numbers for the phenomenological analysis and their experience is wide enough to shed light on the phenomenon (study **I**, **II**, **III**).

6.2.2 Issues of validity, reliability and generalization

Validity is [138] a complex concept including the quantitative study's internal-, construct-, statistical conclusion- and external validity [121]. *Internal validity* as reliability refers to the consistency and accuracy in a study [138]. One limitation in the internal validity of study **IV** was that the naturalistic observations of wakefulness, rooting and sucking could not be blind. In terms of reliability it might be possible that there would not be a stability of the test scores over time with another observer [121]. There was thus a possibility that the nurse could have made subjective naturalistic observations, although in study **IV**, one of the members of the research team (AD) was trained in using the NBAS-based instrument and that helped to give the instrument a 90% inter-rater reliability with a trained observer, as assessed by Brazelton and Nugent [110].

In terms of consensus validity, two observers made inter-observer agreements on the NBAS instrument before the naturalistic observations in study **IV** started. The modified NBAS items had a close relation to the original NBAS items [110] as *construct validity* [121].

The RespiTrace plus™ respiratory monitoring system provided an objective instrument since subjective naturalistic observations made by an observer were not required. On the other hand, in study **V**, additional naturalistic observations would rather have strengthened validity. Also, measurements of saturation or blood gases would, in addition, have strengthened the results. The use of RespiTrace plus™ respiratory monitoring system with embedded coils around the abdomen and chest can be questioned. There might have been a limitation in reliability [138] with a possible confounder in the equipment due to the sensitiveness to body movements and positional changes when using this monitoring system. However, despite a large number of available methods for respiratory monitoring, limitations remained regarding adaptation to clinical conditions and difficulties in clinical evaluation [142].

In study **IV** and **V** the audiotape recordings for the infants' vocalization was an addition to the naturalistic observations and can be seen as an objective instrument that strengthened the validity of the study, since the person analyzing the audiotape recordings was not aware of how each infant was cared for. On the other hand in terms of reliability [138], another person analyzing the infants' cry might have translated 'intense cry without time limit' differently from the analyzer in these studies, which may then affect other studies using the same design. Reliability [138] was, however enhanced in studies **IV** and **V** by the fact that the collection of data was made by the trained observer (AD), also familiar with the respiratory monitoring system, RespiTrace plus™.

The amount of observations in study **IV** and **V** made it possible to conduct statistical analyses on the material. Study **IV** and **V** were designed so that the research questions could be answered and compared with other studies in the field. Generalization [121] was strengthened by the fact that other studies in the field were in line with the results of the present studies (**IV**, **V**). In addition, similar statistical methods used in previous studies in the field [57, 61, 118, 119], were used to compare the results in study **IV**, which strengthened the *statistical conclusion validity*. The data gathering methods (study **IV**, **V**) were of different objectivity levels. For example, the naturalistic observations in combination with technical observations, e.g. audiotape recorded cry (study **IV**) and respiratory monitoring (study **V**), ensured reliability of the result outcome.

A study with more participants would have lent weight to the analysis and the *external validity* and *generalization* of the results [121]. Generalization can be strengthened when it is presented on different abstraction levels [143], as it is in the present thesis, with RCT involving a population (study **IV**, **V**) that relates to other RCTs with other related populations, a set of official recommendations and, hopefully, consensus among clinicians, supporting all together the generalization/transferability of the results of the present thesis as a whole. However, the results in study **V** need more extensive exploratory studies on caregiving models and the adaptation of breathing. Miniature CO₂ sensors [142] could possibly improve reliability. So far, the use of respiratory inductance plethysmography has been shown to be valuable for studying respiratory breath-by-breath variables [142, 144]. However, the results of study **V** should be interpreted carefully in relation to their clinical implication.

6.3 CONCLUSION

An infant being separated from its mother should be cared for skin-to-skin with its father or another primary caregiver for the infant's well-being. The fathers as primary caregivers during maternal-infant separation were the source of comfort and approach for the infant immediately following birth. At the same time, the father took the child to himself while the mother, separated from their child, had a strong desire to be close to the baby. Separation meant distress for both infant and mother.

6.4 CLINICAL IMPLICATION

Midwifery care, including care of the newborn infant, has changed worldwide. For example, the mode of birth has changed from vaginal birth to caesarean section being more common, while the concept of normal birth has changed to what was common in delivery wards, including interventions [89]. However, the well-described mother-infant dyad in research from the 1980s -1990s [12, 67] still needs to be illustrated in the changing world of midwifery care for mother and newborn.

This present thesis shows that the baby should be placed skin-to-skin on the father's chest during maternal-infant separation and that the father should be supported as a primary caregiver, different from what has previously been the case in many hospital settings. Antenatal classes must address the father's importance in the infant's well-being and of a father's skin-to-skin care in situations immediately after birth when mother and baby may be separated. When cesarean section is requested, the parents should also be informed that this might involve maternal separation from the infant and, as this might occur, the father as primary caregiver should also be considered.

Parental attitudes towards bonding, the father's early skin-to-skin contact with his infant, as well as the infant's pre-feeding behavior, might be topics for discussion with parents in antenatal classes. Midwives could at the same time reflect on their own professional role in this changed situation of midwifery care and how knowledge about care of the newborn infant could be promoted today.

Through skin-to-skin care, the fathers in these studies seemed to facilitate the development of the infant's pre-feeding behavior during this important period of the infant's life. The father should thus be regarded as the primary caregiver for the infant during separation of mother and baby. Cesarean section guidelines could be rewritten. One point might also be that fathers could be informed about skin-to-skin care with the newborn and his importance in promoting the infant's well-being. In order to support father's immediate skin-to-skin contact with the infant, environmental changes might be needed, for example, the use of comfortable chairs might enhance skin-to-skin care in a prone, upright position.

In order to reduce the amount of time mother and baby are separated, cooperation between delivery, maternity, post-surgery and neonatal wards is recommended. Parents and infants should, if possible, stay together immediately following birth.

6.5 FURTHER RESEARCH

The qualitative studies presented in this thesis should be seen as an attempt to give descriptions to the meaning of the mothers' and fathers' experiences as a base for reflection for both care staff and parents-to-be. The father's role in their infant's well-being during the immediate postpartum period is identified as an area that requires further investigation, since fathers distress has been shown to affect father-infant bonding/attachment [19], as well as their own emotional well-being [90]. Another area for further research might be to identify the midwives' professional influence [145] on the father's care of the newborn infant.

The situation of infants being separated from their mothers due to intervention or caesarean section conveys a demand for further development of evidence-based care for full-term infants. The effects of caregiving models on the full-term infants' well-being still needs to be examined [146], especially after caesarean birth, and physical parameters such as oxytocin levels, heart rate, and respiratory adaptation, need to be measured, with developed respiratory monitoring for methodological rigor suggested as a further follow-up study to the results presented in study V.

The effects of the father's skin-to-skin care on the onset of breastfeeding compared to infants cared for by fathers without skin-to-skin placement, needs further investigation. A hypothesis would be that the father's skin-to-skin contact enhances the mother-infant reunion and the onset of breastfeeding.

SUMMARY IN SWEDISH

POPULÄRVETENSKAPLIG SAMMANFATTNING

Avhandlingens titel är "Omvårdnad av det nyfödda barnet vid mor barn separation" Den handlar om pappan som vårdare direkt efter födseln och mammornas upplevelser av separation och återförening med barnet. Det övergripande syftet var att beskriva pappans omvårdnad av det nyfödda barnet direkt efter födseln och mammans erfarenheter av separation och senare återförening med barnet för att understödja utveckling av omvårdnad av det nyfödda barnet vid mor barn separation.

Tidigare studier har visat att den optimala situationen för mor och barn är när de har möjlighet att vara hud mot hud de första timmarna efter en normal förlossning utan interventioner och att barnet själv får söka sig till bröstet för att suga med hjälp av doften från bröstvårtan. Det nyfödda barnet har visat sig upprätthålla sin kroppstemperatur hud mot hud och barnet gråter mindre hud mot hud med sin mamma än separerad från henne. Den nära kontakten främjar också anknytningsprocessen mellan mamma och barn och det nyfödda barnet kan kommunicera med ljud och titta på föräldrarna och härma. Eftersom barnet ofta är vaken och lugn på mammans bröst de första timmarna efter förlossningen kan barnet kommunicera med sin mamma eller pappa under den tiden, sedan somnar barnet och sover den mesta tiden under det kommande dygnet.

Alla barn har inte möjlighet att vara hud mot hud med sin mamma de första timmarna efter födseln. Ett exempel är förlossning med kejsarsnitt där mor och barn ofta inte har möjlighet att vara hud mot hud så länge. När mamma och barn av olika anledningar måste skiljas åt för kortare eller längre tid efter en födsel tar pappan ofta hand om barnet. Därför ville vi studera vad som sker när barnet är med sin pappa. Vi vet inte så mycket om det fullgångna barnets beteende hud mot hud med sin pappa eller hur deras möte formas. Omvårdnaden av det nyfödda barnet, pappans roll och mammans erfarenheter i samband med mor barn separation behövde därför studeras.

Delstudierna belyser olika perspektiv på omvårdnad av det nyfödda barnet direkt efter födseln med kvalitativa och kvantitativa metoder. Mammans upplevelser av separation och återförening med barnet beskrevs i studie **I** och den studien var utgångspunkten för projektet. Pappans livsvärld när han var ensam med barnet under mammans observationsperiod efter planerat kejsarsnitt beskrevs i studie **II** och hans upplevelser av att ta hand om sitt barn som primär vårdgivare när mamma och barn var åtskilda på grund av mammans postoperativa vård beskrevs i studie **III**. Barnets fysiska välmående har jämförts hud mot hud med pappan alternativt när barnet ligger i en barnsäng med pappan bredvid (studie **IV** och **V**).

Resultaten av studie **I** beskriver mammornas starka önskan att få vara nära barnet. De ville vara nära barnet under alla omständigheter och vara informerade om barnet när de inte var tillsammans. Samtliga mödrar som deltog i studien hade upplevt separation från barnet för kortare eller längre perioder och därmed upplevt sårbarhet även i vårdformen samvård. De upplevde att organisation, personalens attityder och andra omständigheter förlängde den tid mor och barn var separerade och sårbarhets. Separation mellan mor och barn upplevdes starkt även under kortare perioder de första dagarna efter förlossningen. Resultatet av delstudie **II** beskrev pappornas första möte med sitt barn efter barnets födelse. Under de timmar far och barn var tillsammans fick fäderna upprepade erfarenheter av barnets uttryckssätt i form av sök-

och sugrörelser, barnets gny, skrik, sömn och vakenhet. De fick tillfälle att ta hand om barnet emotionellt och praktiskt. Varje gång fäderna såg ut att uppleva att de lyckades tolka sitt barns uttryck och göra barnet nöjt tog de ytterligare till sig barnet. Det som visade sig av pappornas livsvärld i observationsstudien (studie II) var en ebb och flodrörelse när pappan allt mer famnade sin nya livssituation och faderskapets åtagande.

Intervjustudien (studie III) belyser det som inte framkom i observationsstudien (studie II) och bekräftar en rörelse mot samhörighet mellan far och barn som karaktäriserades av en förändring inom pappan själv när han successivt och mer direkt lärde känna barnet och tog ansvar för barnet. Papporna upplevde sig starka, kapabla och sig själva som en resurs för barnet, samtidigt osäkra att ta hand om barnet. De upplevde ständig oro för barnets mor, i vissa fall för barnet. Samtidigt var det ett privilegium att få vara tillsammans med barnet i ensamhet med personal tillgänglig. Att vara själv med barnet förstärkte samhörigheten dem emellan. Vissa upplevde sig utsatta och begränsade i sjukhusmiljön, utan ramar för deras åtagande för barnet vård, och förhöll sig passiva. Andra kände sig oförberedda när förlossningen tog en annan vändning än de var förberedda på. De upplevde att de inte visste vad som skulle hända med barnet, barnets mor eller dem själva när de tog hand om barnet, men valde att fokusera på barnet, och oron för barnet och barnets mor minskade. Andra åter upplevde att personalen inte förstod deras viktiga roll för barnets välmående.

Delstudie IV och V jämförde skrik, bröstsökande beteende och andningsadaptation hos friska fullgångna barn födda med planerat kejsarsnitt, vårdade hud mot hud med sin pappa eller i säng under de första två timmarna efter förlossningen. Resultaten visade att de barn som vårdades hud mot hud med sin far grät mindre än de barn som vårdades i säng med pappan sittande bredvid för att ta hand om barnet. Barnen som vårdades hud mot hud kom till ro efter 60 minuter jämfört med 110 minuter för barnen som vårdades i säng. Grupperna visade ett likartat sökbeteende över tid men barnen i hud mot hud gruppen visade mindre sökaktivitet. Barnen i säng sög och sökte under hela observationsperioden medan barnen hud mot hud visade lägre sug-, sök- och vakenhetsgrad. Vakenheten avtog samtidigt som sugaktiviteten för båda grupperna. Barnen i hud mot hud gruppen visade större andetagsvolym samt större minutvolym jämfört med barnen i sänggruppen. När pappan tog hand om sitt barn sittande i en fåtölj med barnet på bröstet såg det ut att ha en positiv inverkan på barnets andningsadaptation.

Det kan finnas ett samband mellan hur barnen vårdas efter planerat kejsarsnitt och deras andningsadaptation, men uppföljande studier behövs. Barnets återförening med mamman och den första amningen kan underlättas av vård hud mot hud med pappan, vilket gjorde barnet lugnt och såg ut att koordinera barnets bröstsökande beteende. Samtidigt knyter pappan an till sitt barn. Därför ska pappan/partnern i första hand ses som primär vårdgivare med barnet hud mot hud, när mamma och barn är åtskilda i samband med barnets födsel.

Separation mellan mor och barn bör minimeras. Föräldrar och barn bör, om möjligt, vara tillsammans de första timmarna efter barnets födsel.

ACKNOWLEDGEMENTS

Many are you who have supported me, colleagues, supervisors, friends and family. I am deeply grateful to all of you!

My gratitude is expressed first to the participants who, in different ways, shared their experiences with me and made this thesis possible.

Special thanks to my supervisor, Professor Kyllike Christensson, for sharing with me your wide research skills and your genuine interest in ‘woman and child health’. I am deeply grateful for the opportunity to have such a respected international researcher as my supervisor. Your early research in the beginning of the 1990s has especially guided me in clinical practice as a midwife and now I have had the opportunity to take it further together with you.

And special thanks to my co-supervisor, Professor Ingegerd Fagerberg, for encouragement to begin the doctoral studies. For sharing with me your wide and deep research skills. You introduced me to the epistemology and ontology of lifeworld research and challenged me to think critically and to persevere in new directions.

Thanks to my mentor, Professor Ingela Rådestad, for your support.

Thanks to my co-authors, Ann Dsilna and Baldvin Jónsson, for sharing your experiences, for participation, your clever eyes and specific comments.

Thanks to Emeritus Associate Professor Stefan Sörensen, for statistical revision, encouragement and for always listening.

Thanks to Associate Professor Ingegerd Hildingsson, and my friend and colleague Helena Lindgren, and to Marianne Velandia and Barbara Welles-Nyström, for advice on the thesis writing process.

I am grateful to my employer, Mälardalen University, and to my colleagues, directors and doctoral students at the Department of Caring and Public Health Science, who have supported me, as well as the colleagues and doctoral students at the Karolinska Institutet, Department of Woman and Child Health. A warm thanks to Astrid Häggblad, for guidance in the administrative work involved with registration and dissertation.

I am grateful for financial support from the Karolinska Institutet, Mälardalen University and Solstickan.

Thanks for linguistic revision to Pauline Binder, Mike Cole, Margarethe Rehnman and Lena Berg-Nordenberg.

My thanks to Alvar, Daniella and their families for providing me with photos.

Finally, thank you my beloved family and friends who have tried to balance my life with values other than work. I will always remember the heart-shaped paper notes my 8-year-old daughter, put on my memory board by the computer, with the message “*Don’t forget to stop work*” and “*Don’t forget to hug Anna-Maria*”. Well, my answer is, “*This might be the end and the beginning*”.

7 REFERENCES

1. Dahlberg K, Drew N, Nyström M. Reflective lifeworld research (pp. 17- 242). Lund: Studentlitteratur 2001.
2. Merleau-Ponty M. The visible and the invisible (pp. 3-275). Evanston: Northwestern University Press 1968.
3. Løgstrup K. The ethical demand (pp. 9-131). Philadelphia: Fortress Press 1971.
4. Nationalencyklopedin. http://www.ne.se/jsp/search/article.jsp?i_art_id=204941&i_word=Johan%20von%20hoorn http://www.ne.se/jsp/search/article.jsp?i_art_id=124207&i_word=barnmorska http://www.ne.se/jsp/search/article.jsp?i_art_id=274367&i_word=obstetrik (2007-09-08) 2007.
5. Lundgren I. Releasing and relieving encounters (pp. 7-73). Thesis. Uppsala: Uppsala University 2002.
6. Gillis JR. Alltid lika problematiskt att göra fäder av män (Always problematic making men fathers). *Kvinnovetenskaplig tidskrift*. 1993;14:3-21.
7. Lozoff B. Birth and 'bonding' in non-industrial societies. *Developmental medicine and child neurology*. 1983;25(5):595-600.
8. Badinter E. Om mannens identitet (De l'identite' masculine, The male identity, pp.102). Juva: Forum 1994.
9. Rydén B. När kvinnor och män får barn (When women and men get a child, pp. 15-40). Thesis. Lund: Lund University 2004.
10. Moore ER, Anderson GC. Randomized controlled trial of very early mother-infant skin-to-skin contact and breastfeeding status. *Journal of midwifery & women's health*. 2007;52(2):116-25.
11. Chiu SH, Anderson GC, Burkhammer MD. Newborn temperature during skin-to-skin breastfeeding in couples having breastfeeding difficulties. *Birth*. 2005;32(2):115-21.
12. Anderson GC, Moore E, Hepworth J, Bergman N. Early skin-to-skin contact for mothers and their healthy newborn infants. *Cochrane Database of Systematic Reviews*. 2003(2):CD003519.
13. Bystrova K, Matthiesen AS, Widstrom AM, Ransjö-Arvidson AB, Welles-Nyström B, Vorontsov I, et al. The effect of Russian Maternity Home routines on breastfeeding and neonatal weight loss with special reference to swaddling. *Early human development*. 2007;83(1):29-39.
14. Simkin P. The experience of maternity in a woman's life. *Journal of obstetric, gynecologic, and neonatal nursing*. 1996;25:247-52.
15. Hunter B. Conflicting ideologies as a source of emotion work in midwifery. *Midwifery*. 2004;20:261-72.
16. Klaus MH, Kennell JH. Maternal-infant bonding (pp. 5-174). St Louis: Mosby 1976.
17. Bowlby J. Attachment and loss, Vol. 1, Attachment (pp. 177-296). New York: Basic Books 1969.
18. Bowlby J. Attachment and loss. Vol. 2 (pp. 11-458). London: Primlico 1998.
19. Buist A, Morse CA, Durkin S. Men's adjustment to fatherhood: implications for obstetric health care. *Journal of obstetric, gynecologic, and neonatal nursing*. 2003;32(2):172-80.
20. SFS. Lagen om allmän försäkring 1962: 381 (The law on social insurance) <http://www.notisum.se/rnp/SLS/LAG/19620381.HTM> (2007-08-01) V:a Frölunda: Notisum 1962.

21. Villar J, Valladeres E, Wojdyla D, Zavaleta N, Carroli G, Velazco A, et al. Caesarean delivery rates and pregnancy outcomes: the 2005 WHO global survey on maternal and perinatal health in Latin America. *Lancet*. 2006;367(9525):1819-29.
22. Morrison JJ, Rennie JM, Milton PJ. Neonatal respiratory morbidity and mode of delivery at term: influence of timing of elective caesarean section. *British journal of obstetrics and gynaecology*. 1995;102(2):101-6.
23. Liu TC, Chen CS, Tsai YW, Lin HC. Taiwan's high rate of cesarean births: impacts of national health insurance and fetal gender preference. *Birth*. 2007;34(2):115-22.
24. Hamilton BE, Martin JA, Ventura SJ. Births: preliminary data from 2005 <http://0-www.cdc.gov.mill1.sjlibrary.org/nchs/products/pubs/pubd/hestats/prelimbirths05/prelimbirths05.htm> (2007-08-01) Hyattsville, MD, : U. S. department of health and human services. National Center for Health Statistics 2007.
25. Stutchfield P, Whitaker R, Russell I. Antenatal betamethasone and incidence of neonatal respiratory distress after elective caesarean section: pragmatic randomised trial. *British medical journal Clinical research ed*. 2005;331(7518):662-8.
26. Socialstyrelsen. Medical birth registration <http://192.137.163.40/epcfs/FisFrameSet.asp?FHStart=ja&W=1280&H=1024> (2007-07-31) Socialstyrelsen (Swedish national board of Health and Welfare) 2006.
27. Bartholomew S, Crain J, Dzakpasu S, Kohut R, Liu S, Rusen ID, et al. Canadian Perinatal Health Report <http://www.phac-aspc.gc.ca/publicat/cph-rspc03/index.html> (2007-08-02) Ottawa: Minister of Public Works and Government Services 2003.
28. Khawaja NP, Yousaf T, Tayyeb R. Analysis of caesarean delivery at a tertiary care hospital in Pakistan. *Journal of obstetrics and gynaecology*. 2004;24(2):139-41.
29. WHO. Appropriate technology for birth. *Lancet*. 1985;2(8452):436-67.
30. Wiklund I, Edman G, Andolf E. Cesarean section on maternal request: reasons for the request, self-estimated health, expectations, experience of birth and signs of depression among first-time mothers. *Acta obstetrica et gynecologica Scandinavica*. 2007;86(4):451-6.
31. Socialstyrelsen. Cesarean section in Sweden (Kejsarsnitt i Sverige 1990-2001) <http://www.socialstyrelsen.se/> (2007-10-10) 2005.
32. WHO. Postpartum care of the newborn: a practical guide http://www.who.int/reproductive-health/publications/msm_98_3/msm_98_3_11.html (2007-06-25) 1998.
33. Carter MW, Speizer I. Salvadoran fathers' attendance at prenatal care, delivery, and postpartum care. *Pan American journal of public health*. 2005;18(3):149-56.
34. Gungor I, Beji NK. Effects of fathers' attendance to labor and delivery on the experience of childbirth in Turkey. *Western journal of nursing research*. 2007;29(2):213-31.
35. Ny P. Swedish maternal health care in a multiethnic society - including the fathers (pp. 9-10, 51-56). Thesis. Malmö: Malmö University 2007.
36. Hildingsson IM. New parents' experiences of postnatal care in Sweden. *Women Birth*. 2007;20(3):105-13.
37. Hildingsson I, Thomas JE. Women's perspectives on maternity services in Sweden: processes, problems, and solutions. *Journal of midwifery & women's health*. 2007;52(2):126-33.

38. Lumb AB, Nunn JF. Nunn's applied respiratory physiology (pp. 113-137, 460-470). Oxford: Butterworth-Heinemann 2000.
39. Sandberg K, Sjöqvist BA, Hjalmarson O, Olsson T. Effects of delivery by caesarean section on lung function in healthy newborn infants. *Acta paediatrica Scandinavica*. 1986;75(3):470-6.
40. Milner AD, Saunders RA, Hopkin IE. Effects of delivery by cesarean section on lung mechanics and lung volume in the human neonate. *Archives of disease in childhood*. 1978;53:545-8.
41. Jones JG, Sapsford DJ, Wheatley RG. Postoperative hypoxaemia: mechanisms and time course. *Anaesthesia*. 1990;45(7):566-73.
42. Magno R, Kjellmer I, Karlsson K. Anesthesia for cesarean section III: effects of epidural analgesia on the respiratory adaptation of the newborn in elective cesarean section. *Acta anaesthesiologica Scandinavica*. 1976;20(1):73-82.
43. Kampe S, Tausch B, Paul M, Kasper S-M, Bauer K, Diefenbach C, et al. Epidural block with ropivacaine and bupivacaine for elective cesarean section: maternal cardiovascular parameters, comfort and neonatal well-being. *Current medical research and opinion*. 2004;20(1):7-12.
44. Bader D, Riskin A, Paz E, Kugelman A, Tirosh E. Breathing pattern in term infants delivered by caesarean section. *Acta paediatrica*. 2004;93:1216-20.
45. Hägnevik K, Lagercrantz H, Sjöqvist BA. Establishment of functional residual capacity in infants delivered vaginally and by elective cesarean section. *Early human development*. 1991;27(1/2):103-10.
46. Hägnevik K, Faxelius G, Irestedt H, Lagercrantz H, Lundell B, Persson B. Catecholamine surge and metabolic adaptation in the newborn after vaginal delivery and caesarean section. *Acta paediatrica Scandinavica*. 1984;73(5):602-9.
47. Levene MI, Tudehope DI, Thearle MJ. *Essentials of neonatal medicine* (pp. 115-125). Oxford: Blackwell Science 2000.
48. Aarimaa T, Ekblad U, Erkkola R, Kanto J, Kero P. Effect of antepartum ritodrine on the cardiorespiratory status of the newborn after elective cesarean section. *Gynecologic and obstetric investigation*. 1987;23(3):160-6.
49. Eisler G, Hjertberg R, Lagercrantz H. Randomised controlled trial of effect of terbutaline before elective caesarean section on postnatal respiration and glucose homeostasis. *Archives of disease in childhood. Fetal and neonatal edition*. 1999;80(1):88-92.
50. Clarici A, Travan L, Accardo A, De Vonderweid U, Bava A. Crying of a newborn child: alarm signal or protocommunication? *Perceptual and motor skills*. 2002;95(3):752-4.
51. Fleming AS, Corter C, Stallings J, Steiner M. Testosterone and prolactin are associated with emotional responses to infant cries in new fathers. *Hormones and behavior*. 2002;42(4):399-413.
52. LaGasse LL, Neal AR, Lester BM. Assessment of infant cry: acoustic cry analysis and parental perception. *Mental retardation and developmental disabilities research reviews*. 2005;11(1):83-93.
53. Karlberg P. The adaptive changes in the immediate postnatal period, with particular reference to respiration. *The Journal of pediatrics*. 1960;56:585-604.
54. Ludington-Hoe SM, Cong X, Hashemi F. Infant crying: nature, physiologic consequences, and select interventions. *Neonatal network*. 2002;21(2):29-36.
55. Varendi H, Christensson K, Porter RH, Winberg J. Soothing effect of amniotic fluid smell in newborn infants. *Early human development*. 1998;51(1):47-55.

56. Bellieni CV, Sisto R, Cordelli DM, Buonocore G. Cry features reflect pain intensity in term newborns: an alarm threshold. *Pediatric research*. 2004;55(1):142-6.
57. Christensson K, Cabrera T, Christensson E, Uvnäs-Moberg K, Winberg J. Separation distress call in the human neonate in the absence of maternal body contact. *Acta paediatrica*. 1995;84(5):468-73.
58. Ransjö-Arvidson AB, Matthiesen AS, Lilja G, Nissen E, Widström AM, Uvnäs-Moberg K. Maternal analgesia during labor disturbs newborn behavior: effects on breastfeeding, temperature, and crying. *Birth*. 2001;28(1):5-12.
59. Nijhuis JG. Fetal behaviour developmental and perinatal aspects (pp. 129-192). New York: Oxford University Press 1992.
60. Matthiesen AS, Ransjö-Arvidson AB, Nissen E, Uvnäs-Moberg K. Postpartum Maternal Oxytocin Release by Newborns: Effects of Infant Hand Massage and Sucking. *Birth*. 2001;28(1):13-21.
61. Widström A, Ransjö-Arvidson AB, Christensson K, Matthiesen A, Winberg J, Uvnäs-Moberg K. Gastric suction in healthy newborn infants: Effects on circulation and developing feeding behaviour. *Acta paediatrica Scandinavica*. 1987;76(4):566-72.
62. Porter RH, Winberg J. Unique salience of maternal breast odors for newborn infants. *Neuroscience and biobehavioral reviews*. 1999;23(3):439-49.
63. Mizuno K, Mizuno N, Shinohara T, Noda M. Mother-infant skin-to-skin contact after delivery results in early recognition of own mother's milk odour. *Acta paediatrica*. 2004;93:1640-5.
64. Riordan J, Gross A, Angeron J, Krumwiede B, Melin J. The effect of labor pain relief medication on neonatal suckling and breastfeeding duration. *Journal of human lactation*. 2000;16(1):7-12.
65. Radzimirski S. The effect of ultra low dose epidural analgesia on newborn breastfeeding behaviors. *Journal of obstetric, gynecologic, and neonatal nursing*. 2003;32(3):322-31.
66. Anim-Somuah M, Smyth R, Howell C. Epidural versus non-epidural or no analgesia in labour. *Cochrane database of systematic reviews*. 2005(4):CD000331.
67. Klaus MH, Kennell JH, Klaus PH. Bonding (pp. 1-209). Reading: Addison-Wesley Publishing Company 1995.
68. Crenshaw J. Care practices that promote normal birth: no separation of mother and baby with unlimited opportunity for breastfeeding. *The Journal of perinatal education*. 2004;13(2):35-41.
69. Nissen E, Gustavsson P, Widström AM, Uvnäs-Moberg K. Oxytocin, prolactin, milk production and their relationship with personality traits in women after vaginal delivery or Cesarean section. *Journal of psychosomatic obstetrics and gynaecology*. 1998;19(1):49-58.
70. Nissen E, Lilja G, M WA-, Uvnäs-Moberg K. Evaluation of oxytocin levels early post partum in women. *Acta obstetricia et gynecologica Scandinavica*. 1995;74:580-8.
71. Uvnäs-Moberg K. Oxytocin may mediate the benefits of positive social interaction and emotions. *Psychoneuroendocrinology*. 1998;23(8):819-35.
72. Bystrova K, Widström AM, Matthiesen AS, Ransjö-Arvidson AB, Welles-Nyström B, Wassberg C, et al. Skin-to-skin contact may reduce negative consequences of "the stress of being born": a study on temperature in newborn infants, subjected to different ward routines in St. Petersburg. *Acta paediatrica*. 2003;92(3):320-6.

73. Ferber SG, Makhoul IR. The effect of skin-to-skin contact (kangaroo care) shortly after birth on the neurobehavioral responses of the term newborn: a randomized, controlled trial. *Pediatrics*. 2004;113(4):858-65.
74. Renfrew MJ, Lang S, Woolridge MW. Early versus delayed initiation of breastfeeding. *Cochrane database of systematic reviews*. 2000(2):CD000043.
75. Cronenwett LR, Newmark LL. Fathers' responses to childbirth. *Nursing research*. 1974;23(3):210-7.
76. Klaus MH, Kennell JH. Parent-infant bonding (pp.56-62). St. Louis: Mosby Company 1982.
77. Rödhölm M, Larsson K. Father-infant interaction at the first contact after delivery. *Early human development*. 1979;3(1):21-7.
78. Greenberg M, Morris N. Engrossment: The newborn's impact upon the father. *The American journal of orthopsychiatry*. 1974;44(4):520-31.
79. Jones C. Father to infant attachment: effects of early contact and characteristics of the infant. *Research in nursing & health*. 1981;4(1):193-200.
80. Palkovitz R. Fathers' birth attendance, early contact, and extended contact with their newborns: a critical review. *Child development*. 1985;56(2):392-406.
81. Barnombudsmannen. Klara, färdiga, gå! (Author: The children's secretary, Title: Ready, set, go!, pp.78-84). Stockholm: Fritzes 2007.
82. Henwood K, Procter J. "The good father" reading men's accounts of paternal involvement during the transition to first-time fatherhood. *The British journal of social psychology*. 2003;42(3):337-55.
83. Parke RD. *Fatherhood* (pp.1-155). Cambridge: Harvard University press 1996.
84. Rödhölm M. Effects of father-infant postpartum contact on their interaction 3 months after birth. *Early human development*. 1981;5(1):79-85.
85. Ludington-Hoe SM, Hashemi MS, Argote LA, Medellin G, Rey H. Selected physiologic measures and behavior during paternal skin contact with Colombian preterm infants. *Journal of developmental physiology*. 1992;18(5):223-32.
86. Cain Jr RL, Pedersen FA, Zaslow MJ, Kramer E. Effects of the father's presence or absence during a cesarean delivery. *Birth*. 1984;11(1):10-5.
87. Parke RD, Power TG, Tinsley BR, Hymel S. The father's role in the family system. *Seminars in perinatology*. 1979;3(1):25-34.
88. Palkovitz R. Changes in father-infant bonding beliefs across couples' first transition to parenthood. *Maternal-child nursing journal*. 1992;20(3-4):141-54.
89. Gagnon AJ, Meier KM, Waghorn K. Continuity of nursing care and its link to cesarean birth rate. *Birth*. 2007;34(1):26-31.
90. Greenhalgh R, Slade P, Spiby H. Fathers' coping style, antenatal preparation, and experiences of labor and the postpartum. *Birth*. 2000;27(3):177-84.
91. Wikander B, Theorell T. Fathers' experience of childbirth and its relation to crying in his infant. *Scandinavian journal of caring sciences*. 1997;11(3):151-8.
92. Nyström K, Axelsson K. Mothers experience of being separated from their newborns. *Journal of obstetric, gynecologic, and neonatal nursing*. 2002;31(3):275-82.
93. Berg M, Dahlberg K. A phenomenological study of women's experiences of complicated childbirth. *Midwifery*. 1998;14:23-9.
94. Wigert H, Johansson R, Berg M, Hellström AL. Mothers' experiences of having their newborn child in a neonatal intensive care unit. *Scandinavian journal of caring sciences*. 2006;20:35-41.
95. DiMatteo MR, Morton SC, Lepper HS, Damush TM, Carney MT, Pearson M, et al. Caesarean childbirth and Psychosocial Outcomes: A Meta-Analysis. *Health psychology*. 1996;4:303-14.

96. Uvnäs-Moberg K. Neuroendocrinology of the Mother-Child Interaction. Trends in endocrinology and metabolism. 1996;7(4):126-31.
97. Nissen E, Uvnäs-Moberg K, Svensson K, Stock S, Widström AM, Winberg J. Different patterns of oxytocin, prolactin but not cortisol release during breastfeeding in women delivered by caesarean section or by the vaginal route. Early human development. 1996;45(1-2):103-18.
98. Nissen E. Effects of some routines on behavioural and physiological adaptation to breast-feeding (pp. 9-32). Thesis. Stockholm: Karolinska Institutet 1996.
99. Jurdi R, Khawaja M. Caesarean section rates in the Arab region: a cross-national study. Health policy and planning. 2004;19(2):101-10.
100. Penn Z, Ghaem-Maghani S. Indications for caesarean section. Best practice & research. Clinical obstetrics & gynaecology. 2001;5(1):1-15.
101. Rowe-Murray HJ, Fisher JR. Baby friendly hospital practices: Caesarean section is a persistent barrier to early initiation of breastfeeding. Breastfeeding review. 2003;11(1):21-7.
102. Rowe-Murray HJ, Fisher JR. Operative intervention in delivery is associated with compromised early mother-infant interaction. BJOG : an international journal of obstetrics and gynaecology. 2001;108(10):1068-75.
103. Wagner M. Fish can't see water: the need to humanize birth. International journal of gynaecology and obstetrics. 2001;75 Suppl 1:25-37.
104. Merleau-Ponty M. Phenomenology of perception (pp. 3-530). London: Routledge 1945/2002.
105. Giorgi A. The theory, practice, and evaluation of the phenomenological method as a qualitative research procedure. Journal of Phenomenological Psychology. 1997;28(2):235-61.
106. Giorgi A. Phenomenology and psychological research (1-153). Pittsburgh: Duesquesne University Press 1985.
107. Gerrish K, Lacey A. The research process in nursing (pp. 245-540). Oxford: Blackwell Publishing 2006.
108. Edwinston-Månsson M, Enskär K. Pediatrisk vård och specifik omvårdnad (Paediatric nursing care, pp. 1-369). Lund: Studentlitteratur 2000.
109. Wallin L. Omvårdnad av det nyfödda barnet (Caring of the newborn baby, pp. 24-47, 164-190). Lund: Studentlitteratur 2001.
110. Brazelton TB, Nugent JK. Neonatal Behavioral Assessment Scale (pp. 1-70). London: Mac Keith Press 1995.
111. Als H. Manual for the naturalistic observation of the newborn behavior (preterm and fullterm). Newborn Individualized Developmental Care and Assessment Program (NIDCAP). Boston: The Children's Hospital, 1984/ Revision 1995.
112. Sparshott M. The development of a clinical distress scale for ventilated newborn infants: identification of pain and distress based on validated behavioral scores. Journal of Neonatal Nursing. 1996;2(2):5-11.
113. Duffy P, Spriet L, Bryan MH, Bryan AC. Respiratory induction plethysmography (Respitrace): an evaluation of its use in the infant. The American review of respiratory disease. 1981;123(5):542-6.
114. Dolfen T, Duffy P, Wilkes DL, Bryan MH. Calibration of respiratory induction plethysmography (Respitrace) in infants. The American review of respiratory disease. 1982;126(3):577-9.
115. Giorgi A. The status of Husserlian phenomenology in caring research Scandinavian journal of caring sciences. 2000;14:3-10.
116. Dahlberg K, Dahlberg H. Description vs. interpretation- a new understanding of an old dilemma in human science research. Nursing philosophy. 2004;5:268-73.

117. © SPSS for Windows Inc. Rel. 11.5.1 ed. Chicago: SPSS Inc 2002.
118. Christensson K, Siles C, Moreno L, Belaustequi A, De La Fuente P, Lagercrantz H, et al. Temperature, metabolic adaptation and crying in healthy full-term newborns cared for skin-to-skin or in a cot. *Acta paediatrica*. 1992;81: 488-93.
119. Christensson K, Siles C, Cabrera T, Belaustequi A, de La Fuente P, Lagercrantz H, et al. Lower body temperatures in infants delivered by caesarean section than in vaginally delivered infants. *Acta paediatrica*. 1993;82:128-31.
120. Siegel S, Castellan NJ. *Nonparametric statistics for the behavioral sciences* (pp. 128-137, 235-244). New York: McGraw-Hill book company 1988.
121. Kazdin AE. *Research design in Clinical Psychology* (pp. 15-61, 267-269, 294-297, 370-373). Boston: Allyn & Bacon 1998.
122. Sykepleiernes samarbeid i Norden (Ethical guidelines for nursing research in the Nordic countries, pp. 31). Copenhagen The Northern Nurses Federation 1995.
123. Klaus M, Kennell J, Plumb N, Zuehlke S. Human Maternal Behavior at First Contact with Her Young. *Pediatrics*. 1970;46(2):187-92.
124. Jackson K, Ternstedt B-M, Schollin J. From alienation to familiarity: experiences of mother and fathers of preterm infants. *Journal of advanced nursing*. 2003;43(2):120-9.
125. Marcel G. *Tragic wisdom and beyond* (pp. 187-198). Evanston: Northwestern University Press 1973.
126. de Montigny F, Lacharite C. Fathers' perceptions of the immediate postpartum period. *Journal of obstetric, gynecologic, and neonatal nursing*. 2004;33(3):328-39.
127. Norberg A, Bergsten M, Lundman B. A Model of Consolation. *Ethics* 2001; 8(6):544-53.
128. Vaidya K, Sharma A, Dhungel S. Effect of early mother-baby close contact over the duration of exclusive breastfeeding. *Nepal Medical College journal*. 2005;7(2):138-40.
129. Awi DD, Alikor EA. Barriers to timely initiation of breastfeeding among mothers of healthy full-term babies who deliver at the University of Port Harcourt Teaching Hospital. *Nigerian journal of clinical practice*. 2006;9(1):57-64.
130. Chien LY, Tai CJ. Effect of delivery method and timing of breastfeeding initiation on breastfeeding outcomes in Taiwan. *Birth*. 2007;34(2):123-30.
131. Waldenström U. Women's memory of childbirth at two months and one year after the birth. *Birth*. 2003;30(4):248-54.
132. Waldenström U. Why do some women change their option about childbirth over time? *Birth*. 2004;31(2):102-7.
133. Johnson MP. The implications of unfulfilled expectations and perceived pressure to attend the birth on men's stress levels following birth attendance: a longitudinal study. *Journal of psychosomatic obstetrics and gynaecology*. 2002;23(3):173-82.
134. Dahlberg H, Dahlberg K. To not make definite what is indefinite: A phenomenological analysis of perception and its epistemological consequences in human science research. *The Humanistic Psychologist*. 2003;31:34-50.
135. Dahlberg K. The essence of essences-the search for meaning structures in phenomenological analysis of lifeworld phenomena. *International Journal of Qualitative Studies on Health and Well-being*. 2006;1:11-9.

136. Sandelowski M. Combining qualitative and quantitative sampling, data collection, and analysis techniques in mixed-method studies. *Research in nursing & health*. 2000 Jun;23(3):246-55.
137. Olsson H, Sörensen S. *Forskningsprocessen (The research process, pp. 24-39, 66-77, 137-155)*. Stockholm: Liber 2007.
138. Polit D, Beck CT. *Nursing research principles and methods (pp.35-41, 218-304)*. Philadelphia: Lippincott Williams & Wilkins 2004.
139. Creswell JW. *Qualitative inquiry and research design- Choosing among five traditions (pp. 197-208)*. London: Sage Publications 1998.
140. Sandelowski M. Whatever Happened to Qualitative Description? *Research in nursing & health*. 2000;23:334-40.
141. Polit DF, Hungler BP. *Nursing research principles and methods (pp. 663-664, 716-717)*. Philadelphia: Lippincott Company 1999.
142. Folke M, Cernerud L, Ekström M, Hok B. Critical review of non-invasive respiratory monitoring in medical care. *Medical & biological engineering & computing*. 2003;41(4):377-83.
143. Galligan M. Proposed guidelines for skin-to-skin treatment of neonatal hypothermia. *The American journal of maternal child nursing*. 2006;31(5):298-304.
144. Williams BA, Smyth J, Boon AW, Hanson MA, Kumar P, Blanco CE. Development of respiratory chemoreflexes in response to alternations of fractional inspired oxygen in the newborn infant. *The Journal of physiology*. 1991;442:81-90.
145. Lindberg I, Christensson K, Öhrling K. Midwives' experience of organisational and professional change. *Midwifery*. 2005;21(4):355-64.
146. Walters MW, Boggs KM, Ludington-Hoe S, Price KM, Morrison B. Kangaroo Care at Birth for Full Term Infants: A pilot study. *The American journal of maternal child nursing*. 2007;32(6):375-81.