



REIJA LATVA

Preterm Birth and Hospitalisation

Experiences of mother and child



ACADEMIC DISSERTATION

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for public discussion in the Main Auditorium of Building K,
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ACADEMIC DISSERTATION

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List of original communications

This review is based on original communications referred to in the text by their Roman numerals I-IV.

- I Latva R, Lehtonen L, Salmelin RK, Tamminen T (2004): Visiting Less Than Every Day – A Marker for Later Behavioral Problems in Finnish Preterm Infants. Arch Pediatr Adolesc Med 158:1153-1157.
- II Latva R, Lehtonen L, Salmelin RK, Tamminen T (2007): Visits by the family to the neonatal intensive care unit. Acta Paediatrica 96:215-220.
- III Latva R, Korja R, Salmelin RK, Lehtonen L, Tamminen T (2008): How is maternal recollection of the birth experience related to the behavioral and emotional outcome of preterm infants? Early Human Development 84:587-594.
- IV Latva R, Lehtonen L, Salmelin RK, Tamminen T. What do children's narratives tell about prematurity, early separation and maternal bonding difficulty among preterm children? (Submitted)

Abbreviations

| | |
|----------------|---|
| ADHD | Attention deficit and hyperactive disorder |
| BPD | Bronchopulmonary dysplasia |
| CBCL | Child Behavior Checklist |
| CI | Confidence Intervals |
| CLIP | Clinical Interview for Parents of High-Risk Infants |
| ELBW | Extremely low birth weight |
| EPDS | Edinburgh Postnatal Depression Scale |
| IVH | Intraventricular haemorrhage |
| M | Mean |
| Md | Median |
| MSSB | MacArthur Story Stem Battery |
| NEC | Necrotising enterocolitis |
| NICU | Neonatal Intensive Care Unit |
| OR | Odds ratio |
| Q ₁ | Lower quartile |
| Q ₃ | Upper quartile |
| SD | Standard deviation |
| STAI | State-Trait Anxiety Inventory |
| TAUH | Tampere University Hospital |
| VLBW | Very low birth weight |

Abstract

Preterm birth and hospitalisation of the infant is a stressful situation for the parents, complicating the first months with the child, but it is also stressful for preterm infants, who start their life more or less separated from their mothers. This study was designed to approach the preterm birth, hospitalisation and their long-term effects through the mother's and child's experiences. The parent's presence in the neonatal intensive care unit (NICU) and its effects on the socio-emotional development of the preterm child were examined by evaluating parental visiting frequency and its effects on the subsequent behavioural and emotional symptoms of the child (Studies I-III). Additionally, mothers' experiences related to the preterm birth and the first encounter with the infant as well as early mother-infant physical contact prior to admission to the NICU and mother's feeling that "the baby does not belong to her" were evaluated by eliciting mothers' recollections of the birth of the preterm child (Studies III, IV). The associations of these recollections with the behavioural and emotional symptoms of the child were examined. Child's internalised experiences were assessed by evaluating the child's ability to address separation situations and use of caring representations of parents in play narratives (IV). The association of child's internalised experiences with early mother-infant separation due to hospitalisation, mother's recollections related to preterm birth and mother's feeling that "the baby does not belong to her" were assessed.

This dissertation consists of two different samples of preterm children (birth weight less than 2500 g and/or gestational age less than 37 weeks), one including preterm children born in Tampere University Hospital in 1989 (n = 47; Study I) and the other sample including all preterm children born in the same hospital in 1997-98 (n = 210; Study II). In addition, one subsample including singleton preterm children born in 1998 and their full-term control children was formed (n = 68; Studies III, IV). Parent's visiting frequency in the NICU and factors affecting visiting were retrospectively collected from the hospital records of the infants. When the children of the first study sample were seven to eight years of age the children's behavioural and emotional symptoms were assessed by the Child Behavior Checklist (CBCL) completed by the mothers. When the children born in 1998 were five to six years old, the mother's recollections related to the birth of the infant and the feeling that "the baby does not belong to her" were elicited by interviewing the mothers using the Clinical Interview for Parents of High-Risk Infants (CLIP). During the same research visit, children's behavioural and emotional symptoms were evaluated by CBCL completed by the mothers

and their internalised representations by play narratives (MacArthur Story Stem Battery, MSSB).

Parents were active visitors in the NICU, and when evaluating the factors related to their visiting frequency, lower gestational age of the infant and longer distance between the hospital and home were associated with decreased maternal visiting. By contrast, only family factors such as the existence of siblings and distance between the hospital and home were associated with the visiting frequency of the fathers. Mother's daily visits were associated with fewer subsequent behavioural and emotional symptoms of the preterm child. Mothers of preterm infants reported more negative recollections of the birth and the first encounter with the infant than mothers of full-term infants still after five to six years, and these negative recollections were associated with more concurrent behavioural and emotional symptoms of the preterm child. Interestingly, the lack of early physical mother-infant contact prior to admission to the NICU was also associated with more behavioural and emotional symptoms of preterm child. When the child's experiences were evaluated, the length of early hospitalisation was associated with the child's poorer ability to address separation situations in the play narratives. In addition, the mother's feeling that "the baby does not belong to her" during the infant's hospitalisation seemed to have long-term effects on the development of the child's caring representations of the parents.

These findings emphasise the importance of maternal experiences during the birth of the preterm infant and their association with the child's socio-emotional development. Therefore, it is important to identify and help mothers with negative or traumatic delivery experiences as early as possible. It might also be possible to prevent some of the negative experiences by ensuring consistency of care and adequate information. The findings also emphasise the importance of mother's presence in the NICU and shows that maternal visiting frequency provides a simple and inexpensive indicator of a group of children at increased risk for subsequent behavioural and emotional symptoms. The findings also underline the importance of early physical mother-infant contact right after the birth of the preterm infant. Although early physical contact is not always possible because of initial resuscitation of a critically ill preterm infant the importance of this should be recognised, and whenever even a brief early physical contact between mother and infant is feasible, it should be made possible. If early physical mother-infant contact is impossible, it is important to motivate the mother and the father to participate in the care of their preterm infant, to have physical contact with the infant as soon as it is possible, and to organise the facilities of neonatal units in such a way that they support parents' presence and active participation.

Tiivistelmä

Keskossynnytys ja vauvan sairaalahoito on vanhemmille stressaava tilanne, joka vaikeuttaa ensimmäisiä kuukausia lapsen kanssa, mutta tilanne on myös kuormittava keskosvauvalle, joka aloittaa elämänsä erossa äidistään. Tämän tutkimuksen tarkoituksena oli lähestyä keskossynnytystä, varhaista sairaalahoitoa ja niiden pitkäaikaisvaikutuksia äidin ja lapsen kokemusten kautta. Vanhemman läsnäoloa vastasyntyneiden teho-osastolla ja sen vaikututusta keskoslapsen sosio-emotionaaliseen kehitykseen selvitettiin arvioimalla vanhempien vierailujen määrää ja vierailujen vaikutusta lapsella myöhemmin esiintyviin käyttäytymisen ja tunne-elämän oireisiin (Tutkimukset I-III). Lisäksi keskossynnytykseen ja vauvan ensimmäiseen kohtaamiseen liittyviä äidin kokemuksia kuten myös varhaista äiti-lapsi sylikontaktia ja äidin tunnetta että ”vauva ei kuulu minulle” arvioitiin kysymällä äidin muistikuvia keskoslapsen syntymästä (Tutkimukset III, IV). Tutkimuksessa selvitettiin myös näiden muistikuvien yhteyttä lapsella myöhemmin esiintyviin käyttäytymisen ja tunne-elämän oireisiin. Lapsen kokemuksia tutkittiin arvioimalla lapsen kykyä käsitellä leikkitarinoissa esiintyviä erotilanteita sekä lapsen tarinoissa esiintyviä vanhempiin liittyviä hoivamielikuvia (Tutkimus IV). Lisäksi arvioitiin lapsen kokemusten yhteyttä lapsen sairaalahoidon keston, äidin muistikuvien keskoslapsen syntymästä ja äidin tuntemukseen että ”vauva ei kuulu hänelle”.

Väitöskirja koostuu kahdesta erillisestä keskoslapsiaineistosta (syntymäpaino alle 2500g ja/tai raskauden kesto alle 37 viikkoa), joista toinen koostuu Tampereen yliopistollisessa sairaalassa vuonna 1989 syntyneistä keskosista (n = 47, Tutkimus I) ja toinen aineisto sisältää kaikki samassa sairaalassa vuonna 1997-98 syntyneet keskosvauvat (n = 210, Tutkimus II). Lisäksi muodostettiin yksi osaotos, joka koostuu vuonna 1998 yksöisraskauksista syntyneistä keskosvauvoista ja heille valituista täysi-aikaisina syntyneistä verrokkilapsista (n = 68; Tutkimukset III, IV). Tiedot vanhempien vastasyntyneiden teho-osasto vierailujen määristä ja vierailuihin vaikuttavia tekijöistä kerättiin retrospektiivisesti lapsen potilaskertomuksesta. Ensimmäisen tutkimusaineiston lasten ollessa seitsemästä kahdeksaan vuoden ikäisiä lapsen käyttäytymisen ja tunne-elämän oireita arvioitiin äidin täyttämällä Child Behavior Checklist (CBCL) kyselylomakkeella. Kun vuonna 1998 syntyneet lapset olivat viidestä kuuteen vuoden iässä lapsen syntymään liittyviä äidin muistikuvia ja tunnetta että ”vauva ei kuulu minulle” selvitettiin haastattelemalla äitiä (Clinical Interview for Parents of High-Risk Infants, CLIP). Saman tutkimuskäynnin aikana lapsen käyttäytymisen ja tunne-elämän oireita kartoitettiin CBCL-

kyselylomakkeen avulla ja lapsen mielikuvia arvioitiin leikkitarinoiden avulla (MacArthur Story Stem Battery, MSSB).

Vanhemmat vierailivat aktiivisesti vauvansa luona vastasyntyneiden teho-osastolla ja kun arvioitiin vanhempien vierailuihin vaikuttavia tekijöitä, lapsen matalampi gestatioikä ja kodin ja sairaalaan pidempi välimatka olivat yhteydessä äidin vähäisempiin vierailumääriin. Isän vierailuihin sitä vastoin vaikutti enemmän perheeseen liittyvät tekijät kuten se, että perheessä oli aikaisempia lapsia tai kodin ja sairaalaan välimatka oli pidempi. Äidin päivittäiset käynnit vauvan luona olivat yhteydessä keskoslapsella myöhemmin esiintyviin vähäisempiin käyttäytymisen ja tunne-elämän oireisiin. Keskoslasten äidit kertoivat enemmän negatiivisia muistikuvia vauvan syntymästä ja ensimmäisestä kohtaamisesta vauvan kanssa kuin täysi-aikaisten lasten äidit vielä viiden - kuuden vuoden kuluttua lapsen syntymästä ja nämä muistikuvat olivat yhteydessä keskoslapsen käyttäytymisen ja tunne-elämän oireisiin. Mielenkiintoinen löydös oli että äidin ja vauvan välisen sylikontaktin puuttuminen ennen vauvan siirtymistä vastasyntyneiden teho-osastolle oli yhteydessä keskoslapsen käyttäytymisen ja tunne-elämän oireisiin. Kun arvioitiin lapsen kokemuksia, varhaisesta sairaalahoidosta johtuva äidin ja vauvan separaation kesto oli yhteydessä lapsen huonompaan kykyyn käsitellä leikkien tarinoissa esiintyviä separaatiotilanteita. Lisäksi lapsen sairaalahoidon aikana äideillä esiintyneellä tunteella, että ”lapsi ei kuulu minulle” näytti olevan pitkäaikaisia vaikutuksia lapsen vanhempiin liittyvien hoivamielikuvien kehittymiseen.

Tulokset korostavat keskossynnytykseen liittyvien äidin kokemusten merkitystä lapsen sosio-emotionaaliseen kehittymiseen ja tämän vuoksi on tärkeää tunnistaa ja auttaa mahdollisimman varhaisessa vaiheessa niitä äitejä, joilla on negatiivisia tai traumaattisia synnytyskokemuksia. Osaa negatiivisista kokemuksista voidaan myös mahdollisesti ehkäistä turvaamalla äidin johdonmukainen hoito ja antamalla hänelle riittävästi tietoa tilanteesta. Tulokset myös korostavat äidin läsnäolon merkitystä vastasyntyneiden teho-osastolla ja tuovat esille, että äidin sairaalavierailujen määrään on tärkeää kiinnittää huomiota, koska ne voivat heijastaa lapsen lisääntyntä riskiä myöhemmille käyttäytymisen ja tunne-elämän ongelmille. Nämä tulokset myös korostavat heti vauvan syntymän jälkeen toteutuvan varhaisen äidin ja keskoslapsen sylikontaktin merkitystä. Vaikka varhainen sylikontakti ei ole aina mahdollinen kriittisesti sairaan lapsen elvytystoimenpiteiden vuoksi on tärkeää tunnistaa sylikontaktin merkitys ja antaa vauva äidin syliin edes pieneksi hetkeksi aina kun se on mahdollista. Jos varhainen äidin ja lapsen sylikontakti ei ole mahdollinen, on tärkeää motivoida äitejä ja isiä aktiivisesti osallistumaan keskoslapsen hoitoon ja olemaan fyysisessä kontaktissa vauvaan niin pian kuin on mahdollista. Lisäksi on tärkeää järjestää vastasyntyneiden teho-osaston tilat siten että ne tukevat vanhempien läsnäoloa ja aktiivista osallistumista vauvan hoitoon.

Introduction

Close mother-infant contact right after the birth is essential for a newborn baby. From the perspective of evolution, a close contact of a newborn to her mother has been crucial for the survival of the infant. Human newborns are very dependent on the mother both physically and psychologically. As preterm infants start their life in a hospital setting separated from their mothers, it creates a challenge to the developmentally important close mother-infant contact. It has long been known that early separation has harmful effects on motherhood and on the development of the child. Advances in neonatal intensive care in recent decades have improved the survival of preterm infants, but the psychological needs of the infants and parents have attracted more attention in recent decade. In clinical practice, however, the participation of parents in the care of their infants has been increasingly facilitated, and nowadays the parents can freely visit the neonatal intensive care unit and participate in the care of their infant. Still, the early separation due to hospitalisation is one of the most stressful aspects of the preterm infants' hospitalisation for the parents.

The development of a child is a product of the continuous dynamic interactions of the child and experiences provided by his/her family and social context (Sameroff and Fiese 2000). Various biological and psychosocial risk factors have been associated with adverse developmental outcome of the child. One important risk factor in the socio-emotional development of the children is maternal psychological distress, the effect of which has been well documented with the full-term children (Zeanah et al. 1997). However, only few studies have examined the effect of maternal psychological distress on the long-term socio-emotional development of preterm children. The need for such research is emphasised by the existing evidence that good caregiving and mother's capacity to adjust her own behaviour moderate the effects of biological risk factors related to the prematurity on child's socio-emotional development.

During development, a child internalises the emotionally important caregiving experiences from repeated daily interaction patterns with his/her parents and creates his/her mental representations of being in the relationship. Early separation due to hospitalisation complicates the beginning of a preterm infant's life and affects the preterm child together with mother-infant interaction and motherhood. Early separation may thus have long-term effects on the child's mental representations of being in the relationship. However, research knowledge on preterm children's own experiences is scarce. Revealing the

preterm child's inner world would offer a more thorough understanding of the child's socio-emotional development.

Review of the literature

Effects of preterm birth on motherhood

Becoming the mother of a preterm infant

Birth of a preterm infant

Becoming a mother is a major life event in a woman's life and for most mothers the experience is positive. The birth of a preterm infant disrupts the normal process of adjustment to motherhood and may turn the mother's feelings of anticipated joy into sorrow, fear and uncertainty about the infant's survival (Stern and Bruschweiler-Stern 1998, Deater-Deckard 2004). In addition, the stress of normal transition to motherhood becomes more complicated by unexpected alteration in mothering and the feelings of helplessness and of inability to protect the baby (Stern and Bruschweiler-Stern 1998).

The delivery and birth of an infant is a delicate situation for a mother, and negative or even traumatic experiences are therefore not uncommon. In a recent study among all mothers, 6.8% reported a negative delivery experience one year after the event (Waldenström et al. 2004). Parallel incidence was found in Finnish study in which 7.2% of mothers reported a negative delivery experience a couple days after the event (Ahonen 2001). The amount of negative delivery experience among the mothers of preterm infants has been assessed to be higher (Waldenström et al. 2004). In all mothers, the prevalence of childbirth induced post-traumatic stress disorder has been estimated to be 2.8-5.6% six weeks after delivery (Creedy et al. 2000, Ayers and Pickering 2001, Davies et al. 2008), and among the mothers of preterm infants the incidence of traumatic symptoms has been estimated to be higher (Kersting et al. 2004, Muller-Nix et al. 2004).

Negative or traumatic delivery experiences have been shown to be associated with unexpected medical complications, dissatisfaction with intrapartum care, feelings of lack of control during labour, feelings of intensive pain and lack of emotional and social support (Creedy et al. 2000, Czarnocka and Slade 2000, Waldenström et al. 2004). The medical condition of the infant may also affect the prevalence of post-traumatic symptoms among mothers of preterm infants (DeMier et al. 2000, Muller-Nix et al. 2004). In addition, the mother's

psychological distress and mental illness during pregnancy influence the posttraumatic reactions after labour (Wijma et al. 1997, Czarnocka and Slade 2000).

Early mother-infant contact

Early mother-infant contact is defined as the skin-to-skin contact in which the newborn baby is placed on mother's chest at birth or soon afterwards for a varying length of time. This early contact has been emphasised as an important factor for the development of maternal attachment. In the early seventies, classic works by Klaus and his colleagues (1972) suggested that the first postpartum days are a sensitive period for maternal bonding. Although this idea of a sensitive period for maternal bonding encountered some criticism in the 1980's (Svejda et al. 1980, Goldberg 1983), new results are giving further support to the beneficial effect of early skin-to-skin contact on maternal attachment (Moore et al. 2007).

Among full-term infants early skin-to-skin contact at birth or soon afterwards has been proven to be beneficial for both the mother and the infant. In a recent, Cochrane review of early skin-to-skin contact between mother and healthy newborn was found to have a positive effect on breastfeeding and maternal attachment behaviour (Moore et al. 2007). Early skin-to-skin contact among full-term infants has also been found to have positive effect on mother-infant interaction when the infant was one year old (Bystrova 2008). In a study conducted by Carfoot and colleagues (2005) the mothers' satisfaction with skin-to-skin contact was compared to routine post-delivery care including the holding of the swaddled newborn. In that study most of the mothers who had an opportunity for an immediate skin contact with their newborns were very satisfied with the care and would prefer skin contact with their newborns in the future.

The beneficial effect of skin-to-skin contact during the preterm infant's hospitalisation on the infant and his/her mother has been widely reported (Conde-Agudelo et al. 2003). However, only few studies have examined early skin-to-skin contact, at birth or soon afterwards, among preterm infants. In the study concerning healthy late preterm infants, early skin-to-skin contact immediately post birth was associated with infant's better cardio-respiratory and thermal stability (Bergman et al. 2004). The effect of early skin-to-skin contact at birth or soon afterwards on maternal attachment or mother-infant interaction among preterm infants has not been reported.

Psychological postpartum reactions of the mother

The birth of a preterm infant is a stressful event for most mothers and therefore psychological postpartum reactions are not uncommon. The most studied postpartum reactions among mothers of preterm infants are symptoms of depression and anxiety. The estimates of the prevalence of postpartum reactions are dependent on the research methods used. A validated screening method for depressive symptoms, used among mothers of both full-term and preterm infants is the Edinburgh Postnatal Depression Scale (EPDS, Cox et al. 1987) and for anxiety symptoms the State-Trait Anxiety Inventory (STAI, Spielberger 1983). In order to obtain comparable estimates of depressive and anxiety symptoms of mothers of preterm infants, the studies using these methods are reviewed in Table 1. Comparing the results of the studies focusing on mothers of preterm infants with studies including full-term or both full-term and preterm infants, the mothers of preterm infants reported more depressive and anxiety symptoms during the postpartum period than the mothers of full-term infants.

Table 1. Depressive and anxiety symptoms among mothers of preterm and full-term infants during post partum.

| Authors, year (Country) | n ⁽¹⁾ | Prevalence of depressive symptoms ⁽²⁾ | | Anxiety symptom scores ⁽³⁾ | |
|---------------------------------------|------------------|---|---|---|---|
| | | Mothers of preterm infants % | Mothers of full-term infants % | Mothers of preterm infants Mean (SD) | Mothers of full-term infants Mean (SD) |
| Davis et al. 2003 (Australia) | 62 | 40 | | | |
| Drewett et al. 2004 (UK) | 637/ 11718 | 15.2 | 9.4 | | |
| O'Hara et al. 1996 (meta-analysis) | 3121 | | 12 | | |
| Allen et al. 2004 (USA) | 116 | | | 43.2 (13.1) | |
| Carvalho et al. 2008 (Spain) | 36 | | | 41.8 (15.2) | |
| Feeley et al. 2005 (Canada) | 72 | | | 45.9 (8.4) | |
| Kersting et al. 2004 (Germany) | 38/30 | | | 48.0 (12.8) | 33.7 (7.4) |
| Skari et al. 2002 (Norway) | 127 | | | | 29.2 (na ⁽⁴⁾) |

¹⁾ Preterm or preterm/full-term.

²⁾ Prevalence rates are based on the Edinburgh Postnatal Depression Scale. In all studies prevalence rates were based on cut-off values ≥ 13 .

³⁾ Values of Anxiety symptoms were based on the State-Trait Anxiety Inventory. In this table only the state anxiety score is reported, because it measures current anxiety symptoms of the mothers.

⁴⁾ Data not available.

The psychological distress of mothers of preterm infants has been associated with more premature and sicker infants (Carter et al. 2005, Schmucker et al. 2005, Zelkowitz et al. 2007), and the lack of social support during the postpartum period (Singer et al. 1996, Zelkowitz et al. 2007). In addition, the stress related to the alterations of the parental role and worries about the child's health have been found to be associated with maternal depression during the first two years of the child's life (Miles et al. 2007). Unresolved traumas in the mother's past history may also be related to maternal postnatal psychological distress. Previous history of traumatic births also increases the risk for long-term clinically significant psychological distress in mothers of full-term infants (Skari et al. 2002).

Hospitalisation of the infant

Mother-infant separation

Preterm infants often spend long periods of time in the hospital. The adverse effects of mother-infant separation due to hospitalisation on motherhood, mother-infant interaction and development of the child have long been known (van der Horst and van der Veer 2009). To reduce the unfavourable effects of separation, liberal hospital visiting for the parents has become more common since beginning of the early seventies. Nowadays, in many European countries the neonatal intensive care units have a liberal visiting policy for parents (Cuttini et al. 1999) and in some units that support family-centered care (Griffin 2006) mothers can even stay in the NICU with their infants. Still, for the mothers of preterm infants the separation from the infant is one of the most stressful aspects of the hospitalisation of infants (Miles et al. 1991, Young Seideman et al. 1997). Other common sources of stress include feeling helpless in not being to protect the baby, in not knowing how to help the baby and the appearance of the fragile and/or sick infant (Miles et al. 1991, Young Seideman et al. 1997).

The effects of hospitalisation on the behavioural and emotional development of young children have been studied among children who were born full-term and admitted in the hospital in infancy. Hospitalisation of young children may have an adverse effect on their subsequent emotional and behavioural development, especially when there are the multiple readmissions between ½ to 5 years of age (Douglas 1975, Quinton and Rutter 1976, Fahrenfort et al. 1996). Among preterm infants the effects of the length of early mother-infant separation due to hospitalisation on the child's subsequent emotional and behavioural symptoms have not been previously reported.

To alleviate the adverse effects of mother-infant separation different kinds of interventions have been developed and those may compensate the effects of

separation and support parenting. The most important intervention is Kangaroo Mother Care defined as skin-to-skin contact between the mother and the diaper-clad infant, between the mother's breasts and under her clothes (Charpak et al. 2005). Kangaroo care has been shown to have beneficial effects on the mother and the preterm infant counteracting the effects of separation (Feldman et al. 2002).

Visiting the neonatal intensive care unit (NICU)

Hospitalisation of the infant challenges the mother on both the practical and psychological level and complicates the early mother-infant interaction. In spite of the importance of visiting the neonatal intensive care unit, only a few studies concerning the visiting frequency of parents have been published. In most of the studies, the information about the visiting frequency is collected prospectively from the daily records kept by nurses or parents. Unfortunately most of the studies limit the recording of the visits to a few weeks of hospitalisation, so the estimate of the visiting frequencies during the whole hospital period is difficult. When studies are compared, the cultural background also needs to be taken into account as the social structure of the society may influence visiting practices. The studies on visiting frequency reported based on reliable methodology are reviewed in Table 2.

The studies made since 1990 have reported higher visiting frequency of the parents than studies made before. Mothers are reported to visit more often than fathers and there is more variation in the visiting frequency of the fathers (Table 2). Less frequent visiting has been found to be related to low socio-economic status, long distances between home and hospital, single parenting, mother's younger age, other children in the family, infant delivered by caesarean, lower birth weight of infant and long hospital stay of the infant. There is a lack of studies, exploring multiple factors simultaneously affecting the visiting frequency of parents. However geographical, family and infant related factors should be seen as an entity jointly affecting parental visiting (Table 2).

Table 2. Factors affecting the visiting frequency of parents to the neonatal intensive care unit.

| Author year, country | n | Description of Infants | Description of parents and family | Data collection | Visiting frequency of parents | Potential explanatory factors of the visiting frequency |
|--------------------------------|-------------------|--|--|---|--|---|
| Rosenfield AG 1980, US | 78 ⁽¹⁾ | - Birth weight (M = 1235 g) - Length of hospitalisation (M = 67.9 days) | - Age of mother (M = 25.9 years) - 81% married - First child in 21% of families - Beyond high school (17% of mothers) | - The whole hospital period - Mother's self-report on a visitors' book | Mother: 1.31 times/week | Mother: No effect: - socioeconomic status |
| Zeskind et al. 1984, US | 32 ⁽²⁾ | - Birth weight (M = 1328 g) - Length of hospitalisation (M = 46.5 days) | - Age of mother (M = 23.8 years) - No other information reported | - The whole hospital period - Nurses recorded the visiting of mothers | Mother: 1.61 times/weeks | Not reported |
| Brown et al. 1989, US | 65 | - Birth weight (M = 1148 g) - Length of hospitalisation (M = 53 days) | - Age of mother (M = 24.0 years) - Age of father (na ⁽³⁾) - 30% married - Beyond high school (33% of mothers) | - The first six weeks of the hospital stay - Nurses recorded the visiting of parents | Mother: 2.2 times/week Father: 1.5 times/week | Parents: Decreased: - lower socioeconomic status - single parenting - mother's younger age |
| Lewy-Shiff et al. 1990, Israel | 50 | - Birth weight (M = 1132 g) - Length of hospitalisation (M = 63 days) | - Age of father (M = 31.2 years) - Age of mother (na ⁽³⁾) - First child in 43% of families | - The whole hospital period - Parent's self-report on a daily form | Mother: 4.3 times/week Father: 3.3 times/week | Father: No effect: - condition of the infant - infant's birth weight - socioeconomic status - age of the father - gender of the infant |

Table 2. Continued.

Table 2. Continued.

| Author year, country | n | Description of Infants | Description of parents and family | Data collection | Visiting frequency of parents | Potential explanatory factors of the visiting frequency |
|--------------------------|-------------------|---|--|---|--|---|
| Callahan et al. 1991, US | 36 ⁽⁴⁾ | - Birth weight (M = 1525 g) - Length of hospitalisation (na ⁽³⁾) | - Age of mother (M = 22.7 years) - First child in 67% of families | - The first two weeks of the hospital stay - Nurses recorded the visiting of parents | Mother: 1.8 to 7 times/week Father: 1.6 to 3.6 times/week | Mother: No effect: - infants birth weight Decreased: - longer home-hospital distance - infant delivered by caesarean Father: No effect: - distance from hospital to home Decreased: - lower birth weight - infant delivered by caesarean |
| Lewis et al. 1991, US | 164 | - Birth weight (M = 1432 g) - Length of hospitalisation (M = 46 days) | Not reported | - The first three weeks of the hospital stay - Nurses recorded the visiting of parents | Not reported | Parents: No effect: - mother's condition - gender of the infant Decreased: - longer hospitalisation - diagnosed IVH ⁽⁵⁾ - socio-economic status - single parenting - siblings |
| Reid et al. 1995, UK | 141 | - Birth weight (M = 1297 g) - Length of hospitalisation (M = 61 days) | - Age of mother (M = 26 years) - 31% of the parents middle class, 66% working class | - Questionnaire when child was four weeks old (question: how often parents visited in the NICU) | Mother: 85% visited daily Father: 79% visited daily | Mother: Decreased: - siblings |

Table 2. Continued.

Table 2. Continued.

| Author year, country | n | Description of Infants | Description of parents and family | Data collection | Visiting frequency of parents | Potential explanatory factors of the visiting frequency |
|---------------------------|------------------|---|--|--|---|--|
| Franck et al. 2003, UK | 110 | <ul style="list-style-type: none"> - Birth weight (na³) - Gestational age (55% infant were ≤ 33 weeks) - Length of hospitalisation (na³) | <ul style="list-style-type: none"> - All the families had other children - No other information reported | <ul style="list-style-type: none"> - 12 days over three consecutive months - Nurses recorded the visiting of parents | <p>Mother: 75% visited each study day</p> <p>Father: 27% visited each study day</p> | <p>Mother: Decreased:</p> <ul style="list-style-type: none"> - longer hospitalisation - siblings <p>Father: No effect: - siblings Decreased: - longer hospitalisation Not reported</p> |
| Erdeve et al. 2009 Turkey | 60 ⁶⁾ | <ul style="list-style-type: none"> - Birth weight (M = 1413g) - Length of hospitalisation (M = 23) | <ul style="list-style-type: none"> - Age of mother (M = 31.0 years) - 100% married - First child in 57% of families | <ul style="list-style-type: none"> - The whole hospital period - Nurses recorded the visiting of parents | <p>Mother: Spent 2.5 hour/day in the NICU</p> | |

¹⁾ Intervention study: infants divided into two groups, 39 infants in each group. Visiting frequency of the control group is reported.

²⁾ Intervention study: infants divided into two groups, 16 infants in each group. Visiting frequency of the control group is reported.

³⁾ Data not available.

⁴⁾ Infants divided into three groups based on distance from hospital to home, 12 infants in each group.

⁵⁾ Intraventricular haemorrhage

⁶⁾ Intervention study: infants divided into two groups, 31 infants in intervention group and 29 in control group. Visiting frequency of the control group is reported.

The effect of the visiting frequency on mothering or on the development of the preterm child has seldom been studied. In a study by Fanaroff and colleagues (1972) the mother's low visiting frequency ($n = 38$; less than 3 visits in two weeks) was associated with serious disorders in mothering and hence with poor outcome of the preterm children (failure-to-thrive, abandoning or battering of the infant and foster care) during the first 24 months of child's age compared to mothers who visited more often ($n = 108$; more than 3 visits in two weeks). Parallel findings of associations of mother's lower visiting with serious disorders in mothering and with poor outcome of the preterm children were also found in another study in 1970 (Hunter et al. 1978). The effect of subtle changes in mother's visiting frequency on the development of mother-infant relationship and on the behavioural and emotional development of preterm child is not known.

Effects of prematurity on the development of the mother-infant relationship

Maternal attachment

Maternal attachment defined as mother's emotional bond or tie towards the infant consist of a behavioural and an emotional level. The behavioural system of maternal attachment is meant to provide protection and care for the child in the various everyday situations (George and Solomon 2008). The emotional level of maternal attachment consists of mother's special affectionate bond with the infant and having the infant in her mind (Stern 1998).

The development of maternal attachment begins during pregnancy and it advances simultaneously with the foetal development (Cohen and Slade 2000). Most of the mothers become emotionally attached to their unborn child during the pregnancy, and only 8% of mothers have shown low levels of prenatal attachment (Condon 1987). During pregnancy the mother begins to develop representations of her baby and herself as a mother. Between the 17 and 28 weeks of gestation there is rapid growth in the richness and quantity of the representations of the baby-to-be (Stern 1998). After the 33 weeks of the pregnancy a mother psychologically prepares for delivery and the imagined baby will gradually step aside so that the mother will be more prepared for a real baby (Stern 1998). Mother's caregiving representations also develop during pregnancy in which the mother prepares to be the one who is the caregiver and her psychological and behavioural strategies are organised in order to provide protection for her own child (Solomon and George 1996).

Mother's disappointment about her maternal feelings and an experience that the infant is not her baby indicates difficulties in the maternal attachment or can

be seen as a sign of impaired bonding (Brockington et al. 2006b). Among all mothers, 8.5-10.5% have a delay in maternal attachment after the birth of the infant (Edhborg et al. 2005, Brockington et al. 2006b). Delay in maternal attachment was defined as the mother expressing disappointment about her maternal feelings lasting at least one week; e.g. she had no feelings or she felt estranged or distant from the baby, feeling that “baby is not her baby” (Brockington et al. 2006b). So far, impaired maternal attachment has been shown to be associated with severe pain during labour, the presence of postnatal psychiatric disorder, and child’s difficult temperament (Robson and Kumar 1980, Kumar 1997, Edhborg et al. 2005).

Mothers of preterm infants are especially susceptible to the delay in maternal attachment and impaired bonding due to preterm labour, psychological distress, early mother-infant separation, and alteration of the parental role (Feldman et al. 1999). Difficulties in early maternal attachment of preterm infants may also have long-term effect of the development of maternal attachment. In a study by Borghini et al. (2006) the mothers of preterm children were reported having more insecure maternal attachment representations during the first two years of infant’s life.

Mother-infant interaction

Mother-infant interaction constitutes an important foundation for the child’s psychological development (Crockenberg and Leerkes 2000). The most central features of early interaction for good mothering are sensitivity and mother’s capacity to adjust her interactive behaviour to the infant’s behaviour and her ability to structure the infant’s experience (Mäntymaa 2006).

Preterm birth and early mother-infant separation complicate the development of early mother-infant interaction. In the last decades, there has been interest in the research field in the effect of prematurity on quality of mother-infant interaction. Some studies have shown that maternal interactive behaviour in mother-preterm infant dyads is more active, stimulating and controlling than in dyads of mothers and full-term infants (Di Vitto and Goldberg 1979, Crnic et al. 1983, Muller-Nix et al. 2004). On the other hand, there are studies reporting no difference in the mother’s interactive behaviour between preterm and full-term infants at 6 to 12 months of age (Singer et al. 2003, Korja et al. 2008a). The mother’s more active and stimulating behaviour with the preterm infant may be seen as adaptive because preterm infants are less responsive than full-term infants and because of that they may need more stimulation to elicit response as speculated by Singer et al. (2003). Maternal psychological distress has been shown to have an effect on the quality of mother-infant interaction showing that mothers with psychological distress are less sensitive and less emotionally involved in interaction than mothers without psychological distress (Muller-Nix et al. 2004, Feeley et al. 2005, Schmucker et al. 2005, Korja et al. 2008b).

In addition, the immaturity of the infant may complicate the development of early mother-infant interaction. During the first year of life in the mother-infant interactions preterm infants have been described to be less socially responsive, less clear in their cues, less able to regulate states of arousal and poorer quality of play and attention (Crnic et al. 1983, Minde et al. 1985, Singer et al. 2003, Korja et al. 2008a). Such preterm children's difficulties in mother-infant interaction may be a consequence of preterm infant's neurological immaturity.

Attachment relationship of the child

Attachment of the child, defined as a specific bond between child and his/her caregiver, develops during the first year of the child's life (Bowlby 1969). Nowadays the attachment patterns of the child are classified in the four main categories; secure, avoidant, ambivalent or resistant and disorganised (Ainsworth et al. 1978, Main and Solomon 1990, Solomon and George 2008). The attachment patterns are based on the child's responses and behaviour in Ainsworth's Strange Situation Procedure, which includes brief episodes of separation and reunion with the parent (Ainsworth et al. 1978).

Both characteristics of the child and mother affect the development of the attachment relationship and therefore prematurity underlies the risks which may affect the quality of attachment of the child. The difficulties in maternal attachment, mother-infant separation and the maternal psychological distress may increase the risk for difficulties in the development of child attachment relationship. In addition, the preterm infant's immaturity and developmental difficulties may hinder the mother-infant interaction and the development of attachment relationship. However, prematurity itself has not been associated with higher rates of insecure attachment relationship (Frodi and Thompson 1985, Goldberg et al. 1986, Easterbrooks 1989), but the serious medical condition of the preterm infant may have adverse effects on the quality of the attachment of the preterm child (Plunkett et al. 1986, Brisch et al. 2005). Mother's psychological distress has also been associated with the insecure attachment more often both in preterm and full-term children (Murray et al. 1996, Poehlmann and Fiese 2001, Coyl et al. 2002).

The development of representations of the child

The child internalises the important aspects of caregiving experiences from repeated daily interaction patterns with his/her parents and creates his/her mental representations of self, of others and of being in the relationship (Stern 1998, Bretherton and Munholland 2008). These inner representations have an effect on the child's behavioural and emotional responses in everyday situations and these representations also guide his/her expectations and reactions in the relationship with other people. When the child begins to use language he/she starts to

organise his/her emotionally meaningful everyday experiences with others in narrative form (Emde 2003, Wolf 2003) and from three years of age children can tell meaningful stories about themselves and their relationships (Bretherton et al. 1990, Oppenheim et al. 1996). Young children's mental representations of their experiences and relationships have mainly been accessed with different kinds of play narrative methods (Bretherton et al. 1990, Green et al. 2000, Bretherton and Oppenheim. 2003).

In play narrative studies children's mental representations of parents have mainly been studied in the context of attachment theory. Child's secure attachment has found to be associated with positive parental representations in the play narratives and his/her good ability to address the story conflicts (Cassidy 1988, Bretherton et al. 1990, Solomon et al. 1995). On the other hand, insecure attachment has been associated with difficulties to address story conflicts, incoherent stories, and anger between the child and caregiver character (Bretherton et al. 1990, Green et al. 2000). Children's internalised experiences have also been studied among maltreated children who represent a heterogeneous group of children who have experienced different kinds of severe forms of malfunction in the parent-child relationship. Such relationships have been associated in play narratives with themes like negative parental representations, aggressive themes and themes of physical abuse or neglect (Toth et al. 1997, Macfie et al. 1999). Among preterm children, however, mental representations of the parents have not been previously studied with the play narratives.

There is also evidence that children's parental representations in play narratives are associated with the children socio-emotional development. In a study by Oppenheim and colleagues (1997) child's negative representations of the mother at 4 years of age predicted the behavioural problems at 5 years of age.

Effects of prematurity on the development of the child

Nowadays the most widely accepted model of the development of the child is the transactional model (Zeanah et al. 1997, Sameroff and Fiese 2000). In that approach the development of the child is seen as a product of the continuous dynamic interactions of the child and experiences provided by his/her family and social context (Sameroff and Fiese 2000). Thus the development of the child is neither a product of the child's characteristics alone nor the experiential context alone, but the interactions between these factors. The various biological and psychosocial risk factors have been associated with the adverse developmental outcome of the child (Zeanah et al. 1997). Biological risk factors have been shown to include prematurity, severe medical illness and infant temperament whereas the psychosocial risk factors include parental psychopathology, low socio-economic status, poverty, poor quality of the marital relationship and

family violence (Zeanah et al. 1997). When evaluating the effect of the individual risk factor it is important to note that the effect of a single risk factor is not specific or linear but the single risk factor may have different consequences and may operate by diverse routes (Rutter and Sroufe 2000). The accumulation of the risk factors has been shown to be more predictive of adverse developmental outcome than exposure to any specific type of risk factor alone (Sameroff and Fiese 2000).

Preterm children's increased risk for behavioural and emotional symptoms during childhood has mainly been explained by biological risk factors related to prematurity, but the psychosocial risk factors related to the parents' psychopathology has also been shown to be important (Pierrehumbert et al. 2003, Gray et al. 2004).

Effects of prematurity on the behavioural and emotional development of a preterm child

Advances in neonatal intensive care during the 1990s have affected the improved survival rates of extremely low birth weight infants (Hack and Fanaroff 2000). However, despite the improved survival rates of preterm infants the prevalence of major disabilities of the children has remained the same, but the low severity dysfunctions like attention and hyperactivity symptoms, behavioural problems and neuropsychological deficits have increased (Aylward 2005). The effects of prematurity on the behavioural and emotional development of the children have been of interest to many researchers for a long time. The results of the studies concerning preterm children are relatively difficult to compare because of wide variation in methodology. Most of the studies have been conducted among children with extremely low birth weight (ELBW, birth weight under 1000g) and very low birth weight (VLBW, birth weight under 1500g) and fewer studies have evaluated the behavioural and emotional symptoms of preterm children as a whole. Emotional and behavioural symptoms are typically assessed by questionnaires completed by parents and teachers, but they have also been studied using diagnostic assessment tools. The most frequently used questionnaire for screening behavioural and emotional symptoms is Achenbach's Child Behavior Checklist (CBCL, Achenbach 1991). Only those studies that were considered reliable on methodology are reviewed here.

On average preterm children have an increased risk for behavioural and emotional symptoms during childhood and adolescence. This was supported in the meta-analysis by Bhutta and colleagues (2002) which included 16 studies involving 1759 preterm children and 2629 full-term controls from age 5 to 14. In addition, the preterm children's behavioural and emotional problems have shown moderate stability during the childhood (Gray et al. 2004). In recent studies concerning 5 to 6-year-old preterm children, 20-23% of children had behavioural

and emotional symptoms assessed by CBCL (Gray et al. 2004, van Baar et al. 2005, Reijneveld et al. 2006).

When evaluating the occurrence of different kinds of behavioural and emotional symptoms, there is general agreement that preterm children have more social problems and attention/hyperactivity symptoms than full-term children. This has been shown in studies where symptoms were evaluated by questionnaires completed by parents and teachers (Hille et al. 2001, Foulder-Hughes and Cooke 2003, Hoff et al. 2004, Delobel-Ayoub et al. 2006, Reijneveld et al. 2006), but also in the studies evaluating the occurrence of ADHD (Szatmari et al. 1990, Ross et al. 1991, Botting et al. 1997, Stjernqvist and Svenningsen 1999). In studies evaluating the prevalence of ADHD among 5 to 13-year-olds, preterm children accounted for 16-23% compared to 6-8% of the full-term controls.

The findings concerning the prevalence of internalising and externalising symptoms have been more contradictory. Most of the studies evaluating internalising symptoms (anxious/depressive symptoms, withdrawn behaviour, somatic complaints) have found higher levels of symptoms among ELBW/VLBW children than full-term children (Horwood et al. 1998, Stjernqvist and Svenningsen 1999, Anderson et al. 2003, Delobel-Ayoub et al. 2006, Reijneveld et al. 2006), but there are also studies reporting no association between prematurity and internalising symptoms (Hille et al. 2001). Higher levels of externalising symptoms (delinquent and aggressive behaviour) among ELBW/VLBW preterm children have also been reported in some of the studies (Horwood et al. 1998, Stjernqvist and Svenningsen 1999, Delobel-Ayoub et al. 2006, Reijneveld et al. 2006), but there are also studies reporting no higher levels of externalising symptoms among preterm children (Hille et al. 2001, Anderson et al. 2003).

Effects of psychological distress of the mother on the development of the preterm child

The adverse effects of maternal psychological distress and mental illness on the socio-emotional development of the children have been well documented in recent decades (Beardslee et al. 1998). Mothers of preterm infants have more psychological distress during the first years of the preterm child's life than mothers of full-term infants (Miles et al. 2007). However, among preterm children the effects of mother's psychological distress on the socio-emotional development of the child has only attracted more attention in recent years.

Only few studies have examined the effect of maternal psychological distress on the behavioural and emotional symptoms of the preterm child. In a study conducted by Pierrehumbert and colleagues (2003) the perinatal risk of preterm infants only partly predicted preterm children's sleeping and eating problems at

18 months of age. More importantly, independently of the perinatal risks, the intensity of the mother's posttraumatic symptoms predicted child's sleeping and eating problems. In a large prospective cohort study on the predictors of preterm children's behavioural problems, mother's psychological distress after the birth of a preterm infant predicted child's behavioural and emotional symptoms at 3, 5 and 8 years of age (Gray et al. 2004). A study by Miceli and colleagues (2000) also emphasised the importance of maternal well-being to the socio-emotional development of the preterm child. In that study mother's psychological distress when the preterm infant was four months old was associated with the child's behavioural and emotional symptoms at 3 years of age.

Although the biological risk factors related to prematurity increase preterm children's risk for behavioural and emotional symptoms during childhood, it is essential to recognise the interacting psychosocial risk factors affecting the development of these vulnerable children. There is evidence that quality of early caregiving and parent's capacity to adjust to the parenthood of the preterm child may moderate the adverse effects of prematurity on the child's socio-emotional development (Laucht et al. 2001).

Aims of the study

The detailed aims of the study were:

- 1) to examine the presence of the parents in the neonatal intensive care unit and their effects on the child by
 - a) exploring parents' visiting frequency to the neonatal intensive care unit and the medical and family factors affecting the visiting frequency (I-III)
 - b) assessing the effects of maternal visiting frequency and the length of hospitalisation of the preterm infant on the behavioural and emotional symptoms of the child at seven to eight years of age (I)
- 2) to examine mother's recollections related to the preterm birth and their effects on the child by
 - a) assessing mother's recollections of the birth of and the first encounter with the preterm child as well as early mother-infant physical contact (III, IV)
 - b) assessing associations between these factors and the behavioural and emotional symptoms of the preterm child at five to six years of age (III)
- 3) to evaluate the child's internalised experiences related to early mother-infant separation and mother's experiences about the preterm birth by
 - a) assessing the effects of the length of hospitalisation of the preterm child on his/her ability to address separation situations in play narratives at five to six years of age (IV)
 - b) assessing associations between the mother's recollection related to the birth of the preterm infant and child's caring representations of parents in play narratives at five to six years of age (IV).

Material and methods

Subjects and study procedures

Definition of prematurity

In all studies, prematurity was defined as birth weight less than 2500 g and/or gestational age less than 37 weeks.

Study I

The target study population consisted of all premature infants born in Tampere University Hospital (TAUH) in 1989, who were admitted to the neonatal intensive care unit (NICU) from the delivery room, stayed there until discharge and who lived in the Tampere region ($n = 79$). An additional inclusion criterion was that the child was capable of attending regular school at seven years of age, corresponding to the age when children starts the first grade of school in Finland ($n = 67$). This criterion excluded 8 disabled children, three children had died and one child was excluded from the study because she had recently lost her mother. In 1989 the NICU of TAUH had 25 beds (8 beds for intensive care and 17 beds as a neonatal ward). Parents were allowed visit the unit without restrictions. There was one family room available for parents with a facility to prepare meals and rest. No childcare was available for siblings.

Data on medical issues and parental visitations during the hospital period were collected retrospectively from the hospital records of the infant (Table 3). During the first school year of the children, at the age of seven to eight years, a questionnaire concerning their behavioural and emotional symptoms was mailed to their mothers. A total of 72% of the mothers returned the questionnaires and formed the study sample ($n = 48$). The questionnaire of one child was incomplete and therefore excluded. Of the resulting 47 children, 23 (49%) were boys and 24 (51%) girls. The characteristics of the preterm infants are shown in the Table 4. The birth weight of 12 infants (25%) was less than 1500g and 9 infants (19%) were born at a gestational age of less than 32 weeks. In the sample, there were eight sets of twins, five of which were intact, with both children meeting the inclusion criteria. In the other three pairs, a twin brother or sister had died during the neonatal period. In addition, there was one set of triplets in which only one child met the inclusion criteria and was accepted for the study; the other two

children were excluded from the study because they had not been admitted to the NICU.

The mean age of the mothers was 29 years (SD 5, range 20-44 years) when the child was born. Sixty-six percent of the mothers did not have other children, 23% of the mothers had one older child, and the rest had two or more older children. Eighty-nine percent of the mothers were married or living in a common-law marriage.

Study II

The study sample consisted of all preterm infants who were born in Tampere University Hospital in 1997-98, who were admitted to the NICU ($n = 278$). The 210 infants who stayed there until discharge were included in the study (Figure 1). The excluded infants consisted of 29 children who were admitted to another hospital before discharge, 33 children who died, and six children who had other reasons, like being adopted or being of foreign origin. Of the included 210 children, 106 were boys and 104 girls. The characteristics of the preterm infants are shown in the Table 4. The birth weight of 49 infants (23%) was less than 1500g, and 57 infants (27%) were born at a gestational age of less than 32 weeks. In the study sample there were 36 sets of twins and three sets of triplets. In 1997-98, there were no changes in the number of beds, visiting policy or facilities for the family in the NICU since the time of Study I.

The mean age of the mothers was 31 years (SD 5, range 18-44 years) when the child was born. Sixty-seven percent of the mother did not have other children, 19% of the mothers had one older child, and the rest had two or more older children. Seventy-nine percent of the mothers were married or living in a common-law marriage. A total of 73% of the families lived in an urban area. The median distance from the hospital was 16 km (Q_1 0, Q_3 38, range 0-106 km).

Data on medical issues and parental visitations during the infant's hospital period were collected retrospectively from the hospital records of the infants (Table 3).

Studies III and IV

The study population was a subsample of the 1998 sample ($n = 116$, Figure 1) used in Study II. It included those singleton preterm children born in Tampere University Hospital in 1998 whose mothers responded to mailed questionnaires when the children were four to five years old; five children were excluded for other reasons ($n = 45$; Figure 1). The same data as in Study II concerning the medical issues of the child and mother's visits during the hospital period were used (Table 3).

Table 3. Summary of measures used in Studies I-IV.

| | Study I (n = 48) | Study II (n = 210) | Study III (n = 68) | Study IV (n = 68) |
|--|---------------------|-----------------------|-----------------------|----------------------|
| <i>Hospital records</i> | | | | |
| Data concerning infant ⁽¹⁾ | x | x | x | x |
| Data concerning hospitalisation of the infant ⁽²⁾ | x | x | x | x |
| Visits to the NICU | | | | |
| Mother | x | x | x | - |
| Father ⁽³⁾ | x | x | - | - |
| Data concerning mother ⁽⁴⁾ | x | x | - | - |
| <i>Questionnaires</i> | | | | |
| Background information form | - | - | x | x |
| Questionnaire on Separation Experience | - | - | x | x |
| Child Behavior Checklist ⁽⁵⁾ | x | - | x | - |
| Edinburgh Postnatal Depression Scale | - | - | x | - |
| <i>Interviews</i> | | | | |
| Clinical Interview for Parents of High-risk Infants ⁽⁶⁾ | - | - | x | x |
| MacArthur Story Stem Battery | - | - | - | x |

¹⁾ Birth weight, gestational age, Apgar scores and diagnoses.

²⁾ Length of hospitalisation, duration of ventilator treatment, supplementary oxygen and parenteral nutrition. This information was not relevant among full-term infants.

³⁾ This information was not relevant in Study III.

⁴⁾ Mother's age, marital status, number of previous pregnancies, domicile.

⁵⁾ The CBCL questionnaire of one child in Study I was incomplete and therefore excluded.

⁶⁾ The CLIP interview of one mother of a full-term child is missing.

The original control group consisted of the gender-matched full-term infants born directly after each preterm infant (n = 116, Figure 2). The controls of Studies III and IV were a subgroup of them, consisting of 65 full-term children whose mothers responded to mailed questionnaires when the children were four to five years of age. A total of 5 children who had been hospitalised by that time were excluded, as were 7 children for other reasons, resulting in 53 full-term children that were included in the study (Figure 2).

The mothers of the children were invited by letter to a research visit when the child was five to six years old. Those mothers who did not respond to the letter were contacted by phone. The mother could decide whether the research visit should take place at the child's home (67%) or at the hospital (33%). The research visit included a structured play session with the child, an interview with the mother and two questionnaires completed by the mother (Table 3). A total of 28 preterm children and their mothers (n = 28/45, 62%) and 40 full-term children (n = 40/53, 75%) participated in Study IV. Only 39 mothers of full-children (n = 39/53, 74%) participated in Study III, because the CLIP interview of one mother is missing.

At the time of the research visit the mean age of the preterm children was 6.2 years (SD 0.4). The characteristics of the preterm children are presented in Table 4. A total of 43% (n = 12/28) of the preterm infants were born by caesarean. The mean age of the mothers was 38 years (SD 6, range 30-49 years) at the time of the research visit. Twenty-one percent of the families had only the participating child, while the rest had two or more children. At the time of research visit all the preterm children were living with both of their biological parents.

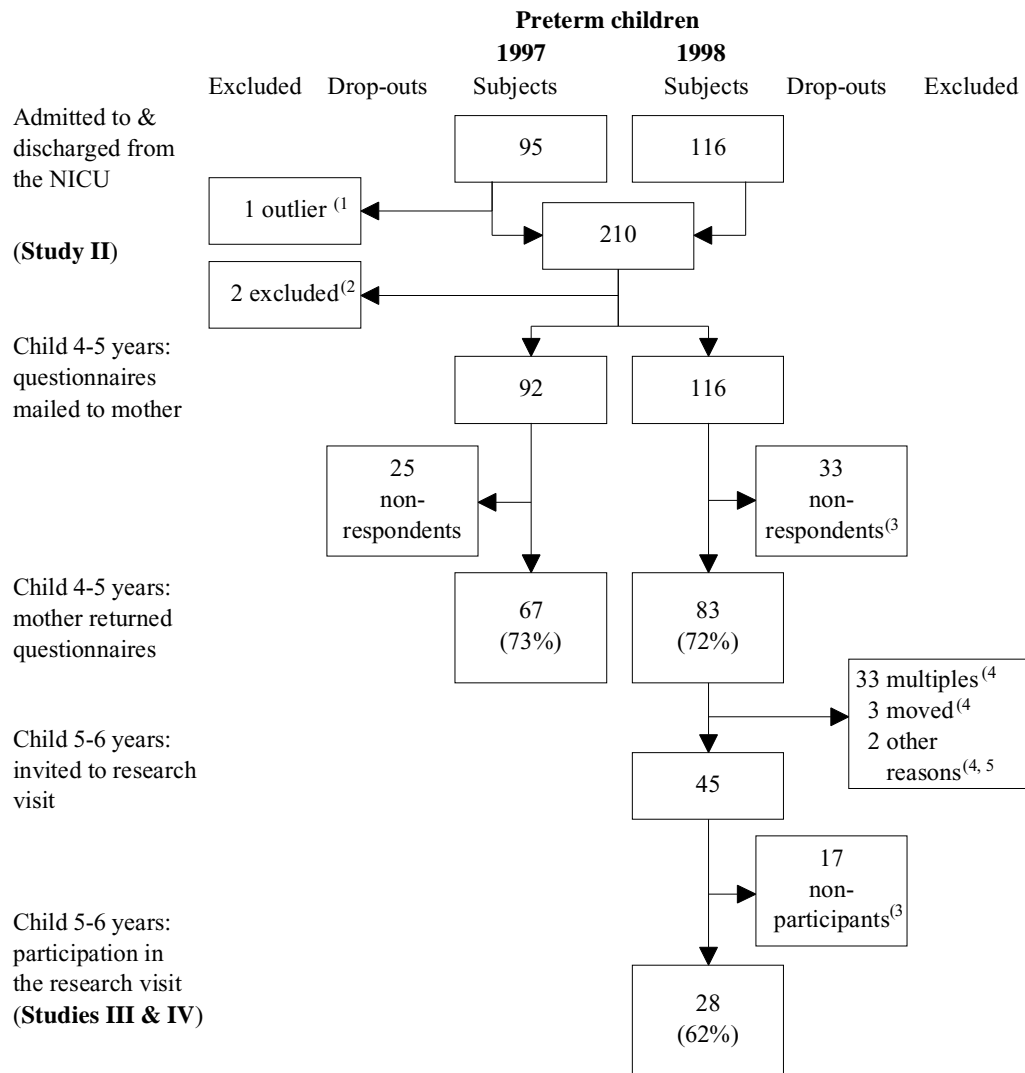
The mean age of the full-term children was 6.2 years (SD 0.3). The median of the full-term children's birth weight was 3630 grams (Q₁ 3270, Q₃ 3830; range 2680-4590 grams) and that of their gestational age was 40 weeks (Q₁ 39, Q₃ 41; range 37-42 weeks). Only one of the full-term infants was born by caesarean. The mean age of the mothers was 38 years (SD 5, range 26-51 years) at the time of the research visit. Five percent of the families had only the participating child, while the rest had two or more children. At the time of the research visit 97% of the full-term children were living with both of their biological parents.

Table 4. Characteristics of the preterm infants in Studies I-IV.

| | Study I (n = 47) | | | | Study II (n = 210) | | | | Study III, IV (n = 28) | | | |
|--|---------------------|------|------------|----------|-----------------------|------|------------|----------|---------------------------|------|------------|----------|
| | % | Md | Q1, Q3 | Range | % | Md | Q1, Q3 | Range | % | Md | Q1, Q3 | Range |
| Gender, boys (%) | 49 | | | | 51 | | | | 50 | | | |
| Firstborn child (%) | 66 | | | | 67 | | | | 50 | | | |
| Birth weight (grams) | | 2060 | 1490, 2375 | 700-3160 | | 1940 | 1518, 2240 | 520-2500 | | 2055 | 1659, 2308 | 900-2470 |
| Gestational age (weeks) | | 35 | 32, 36 | 27-37 | | 34 | 31, 35 | 24-37 | | 33 | 32, 34 | 26-36 |
| Medical risk classification ¹⁾ ; high (%) | - | | | | 27 | | | | 18 | | | |
| Length of hospitalisation (days) | | 21 | 14, 34 | 4-99 | | 26 | 19, 45 | 2-133 | | 23 | 18, 28 | 6-109 |
| | n ²⁾ | Md | Q1, Q3 | Range | n ²⁾ | Md | Q1, Q3 | Range | n ²⁾ | Md | Q1, Q3 | Range |
| Duration of ventilator treatment (days) | 14 | 6 | 2, 18 | 1-48 | 39 | 4 | 2, 7 | 1-60 | 7 | 2 | 1, 20 | 1-41 |
| Duration of supplementary oxygen (days) | 31 | 2 | 2, 10 | 1-32 | 113 | 3 | 1, 16 | 1-125 | 21 | 2 | 1, 5 | 1-103 |
| Duration of parenteral nutrition (days) | 25 | 3 | 2, 4 | 1-62 | 137 | 7 | 3, 11 | 1-61 | 15 | 4 | 3, 21 | 2-61 |

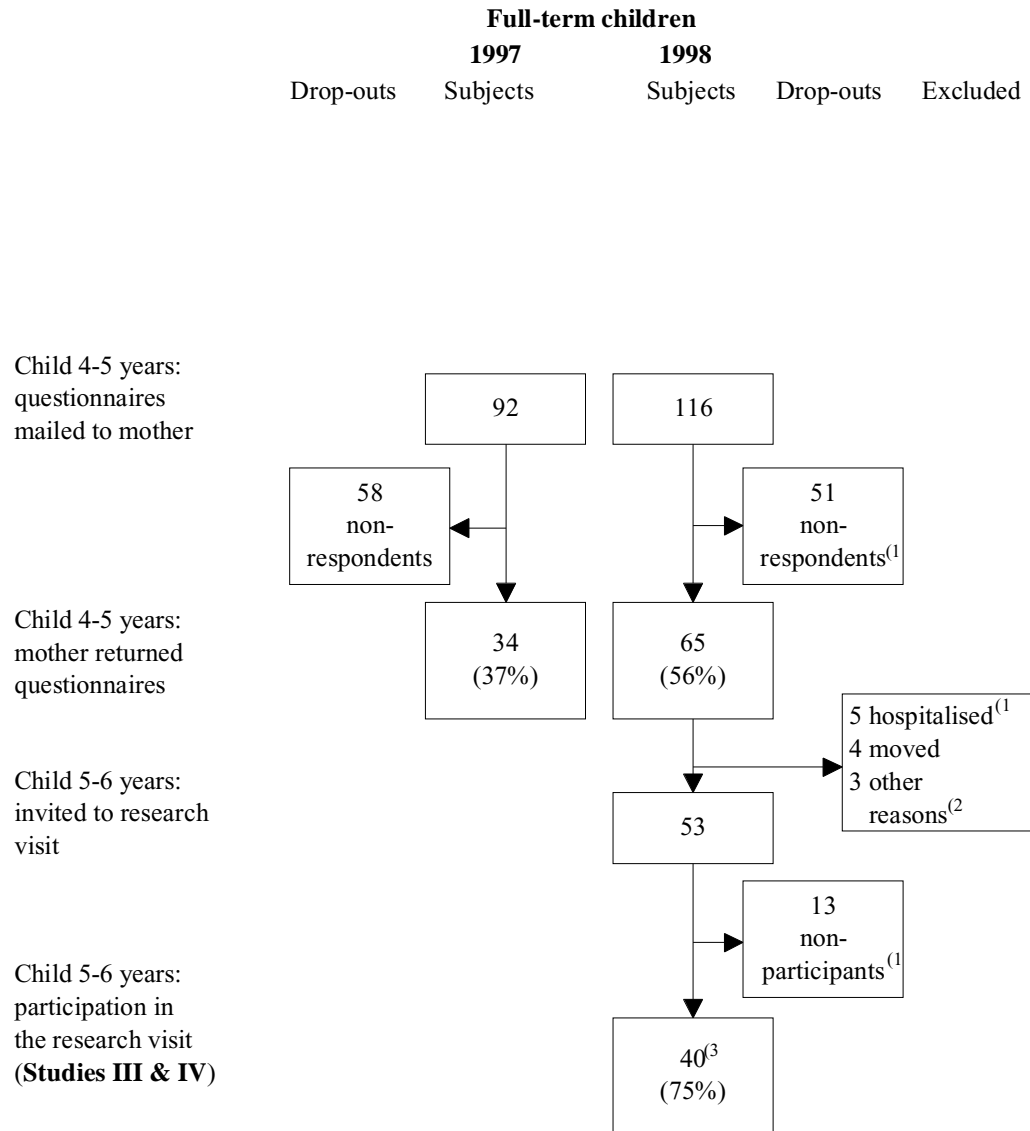
¹⁾ Infant's medical risk classification (low risk: birth weight \geq 1500 g and no diagnosis of IVH, BPD or NEC; high risk: birth weight < 1500 g or one diagnosis from IVH, BPD or NEC.

²⁾ Number of infants each treatment applies to.



- 1) Length of hospitalisation was 313 days for one child who was partially in home care.
- 2) Address was not known for one child, and one child stayed in the NICU less than one day and had no visits .
- 3) There was no difference in the background information (birth weight, gestational age, gender, first born, multiple birth, length of hospital stay, duration of ventilator treatment, supplementary oxygen and parenteral nutrition, infant's medical risk, mother's age, biological parents).
- 4) Drop-outs stayed longer in the hospital ($p = 0.022$), there was no difference in other background information.
- 5) Inadequately completed questionnaires (two children in preterm and full-term group), custody away from the biological parents (one children in full-term group).

Figure 1. Flowchart of the preterm sample of Studies II-IV.



1) No difference in the background information (birth weight, gestational age, gender, firstborn, mother's age, biological parents).

2) Inadequately completed questionnaires (two children in preterm and full-term group), custody away from the biological parents (one children in full-term group).

3) The CLIP interview of one mother of a full-term child is missing.

Figure 2. Flowchart of the full-term sample of Studies II-IV.

Methods

Hospital records

The data concerning the infant and his/her mother, the hospitalisation of the infant and visits by the parents were collected retrospectively from the hospital records of the infant (Table 3). Hospital records of every infant were available and the notes were legible and clearly made.

Visitation data of the mother and father were collected from a special chart included in the hospital records of the infant. The NICU nurses documented all visitors during intensive care in every 8-hour period and during convalescent care on the neonatal ward in every 3-hour period as a part of the nursing charting.

Questionnaires

Background Information Questionnaire

The background information questionnaire (Appendix 1) was developed for this study to gather data about the parents and families of the study children. The questionnaire included the information concerning the number of children living in the family, the gender and year of birth of each child, the type of the family (biological parents, one biological parent and a stepparent, biological parent alone, adoptive parents, foster parents), parents' year of birth, parents' occupation and education.

Child Behavior Checklist (CBCL)

The behavioural and emotional symptoms of the children were assessed with the Child Behavior Checklist (CBCL, Achenbach 1991), Finnish version for 7 to 18-year-old children in Study I and Finnish version for 4-6-year-olds in Study III (Appendices 2 and 3). The CBCL is an internationally used and standardised questionnaire, developed to identify children's behavioural and emotional symptoms and disorders. It includes seven items for assessing the social competence of the child and 118 items and two open-ended questions for parents to report possible concerns. The 118 items are graded as 0 (not true), 1 (somewhat or sometimes true) or 2 (often true or very true).

The total problem score is the sum score of all items (except two items concerning presence of allergy and asthma). In the analysis the items are divided

into eight syndrome profiles: anxious/depressed, withdrawn, somatic complaints, social problems, thought problems, attention problems, rule-breaking behaviour and aggressive behaviour. The first three of these are combined to form the internalising syndrome profile while the last two profiles form the externalising syndrome profile. In the analyses it is possible to use either raw sum scores or normalised T scores. T scores are based on percentiles of normative samples of children obtained from a US national sample, standardised for different age and sex groups. The children are divided into three groups according to their T scores: normal cases (T score under 60), subclinical cases (T score 60-63) and clinical cases (T score over 63). The common procedure when using the CBCL without clinical evaluation of the child is to define caseness as the situation when child's symptoms exceed the subclinical threshold. The validity and reliability of the method have been found to be high (Achenbach 1991). Although the questionnaire has not been validated in Finland, cross-cultural comparisons have yielded relatively small differences in the rates of behavioural and emotional problems and syndrome profiles (Ivanova et al. 2007). In Finland, the CBCL is a widely used questionnaire both in research and in clinical work.

For Studies I and III, only the items assessing the behavioural and emotional symptoms were used, excluding items for social competence as they were not of interest. In both studies questionnaires were completed by the mothers. Normalised T scores were used in Study I and raw sum scores of the total problem score and the internalising and externalising scores were used in Study III.

Edinburgh Postnatal Depression Scale (EPDS)

Mothers' depressive symptoms were assessed with the Edinburgh Postnatal Depression Scale (EPDS, Cox et al. 1987, Appendix 4) in Studies III and IV. The EPDS is an internationally used self-report questionnaire originally developed to assess mother's postnatal depressive symptoms, but it has been found to have satisfactory validity even among non-postnatal women (Cox et al. 1996). The Finnish version of the EPDS has been used both clinically and in research. In the EPDS mothers are asked to choose from the given options those that best describe their feelings during the previous week. The questionnaire consists of 10 items scored 0-3, the sum score of the items thus ranging from 0 to 30. A cut-off point of ≥ 13 , which is recommended for screening major depression, was used in this study (Cox et al. 1987).

Questionnaire on Separation Experiences

The questionnaire on Separation Experiences, adapted to preterm and full-term children (Appendices 5 and 6) was developed for this study. It elicits facts and feelings of the mother about different kinds of separation situations between a child and his/her mother. The questionnaire inquires the number and duration of hospital periods after discharge from hospital after the birth of the infant. In preterm children the first hospitalisation period due to prematurity was not included in the number of hospital periods. The other questions inquire the age of the child when he/she started to attend day care or stayed overnight outside home without parents. Mothers were also asked to assess, on a visual analogue scale (0-100), how easy or difficult they felt it was to leave the child in hospital, day care or overnight outside home without parents. Mothers were also asked how the different kinds of separations seemed to affect the child. The information gathered with this questionnaire was only used to select the study sample of full-term children who had not been hospitalised during their lifetime (until four to five years when the questionnaire was completed) for Studies III and IV.

Interviews

Clinical Interview for Parents of High-Risk Infants (CLIP)

Mother's recollections of the birth and the following hospitalisation of the infant were assessed with the Clinical Interview for Parents of High-risk Infants (CLIP, Meyer et al. 1993). The CLIP is a semi-structured interview to assess the mother's thoughts and feelings about the pregnancy, the delivery, the newborn, and the hospitalisation period, likewise her thoughts and feelings about the child during his/her hospitalisation. It was originally developed for use during the hospitalisation period of a preterm infant, but we modified, with the permission of one of the copyright holders (CH Zeanah), the CLIP to extend the eligibility of the method into later childhood. This required the use of the past tense in some of the questions and the extension of expectations up to the beginning of school. The interview was used both with the mothers of preterm and full-term children. As the CLIP is an interview for the parents of high-risk infants some of the questions were not applicable for full-term infants and were omitted in the control group (Table 5).

Table 5. The coding system of the CLIP interview. This table includes the items used in Studies III and IV. The coding system of the CLIP as a whole is represented in Study III.

| Main area | Item | Classification |
|---|---|--|
| Recollection of the labour and delivery | Recollection of the labour | Positive/ Negative/ Ambivalent/ Neutral |
| Relationship with baby and feelings as parent | First encounter with the newborn | Positive/ Negative/ Ambivalent/ Neutral |
| | Early physical mother-infant contact prior to admission to the NICU | Yes/ No |
| Reaction to NICU ¹⁾ | Recollection of the NICU period | Positive/ Negative/ Ambivalent/ Neutral |
| | Feeling that “the baby did not belong to the mother” | Yes/ No |
| Child’s current condition | Development of the child | Proceed in accordance with his/her years / Problems in development |

¹⁾ These questions were not used with mothers of full-term children.

Mothers were interviewed by the author and all interviews were tape-recorded and transcribed verbatim. There is currently no specific coding system available to analyse the qualitative dimensions of the CLIP interview narrative responses, and therefore a more quantitative approach similar to that described by Keren et al. (2003) was used to analyse the mother’s narrative content during the interview. The items included in the analysis of Studies III and IV are shown in Table 5. All the interviews were coded by the interviewer and fifteen interviews were double-coded by one of the co-authors of Article III (RK). The kappa-values of the individual items used in the analyses of Studies III and IV varied between 0.83-1.00.

MacArthur Story Stem Battery (MSSB)

Children’s representations of the parents and ability to address separation situations were assessed with the MacArthur Story Stem Battery (MSSB, Bretherton and Oppenheim. 2003). The MSSB is a structured play method developed for children under seven years of age. The method consists of dramatic story beginnings to be completed by the child through narrative play. The researcher starts each story by telling the beginning of the story stem. After this, the researcher will ask the child to show and tell what happens next. The stories are played with Duplo lego® dolls and props. The original MacArthur Story Stem Battery contains 14 story stems. In this study each child was presented with nine MSSB story stems (Table 6). The Hospital story was developed by the author for this study together with the one of the original developer of the method (Robinson J).

Table 6. The MSSB stories used in the study. The family of the stories (Duplo lego® dolls) includes Mom, Dad, two sisters/brothers and the family dog. The stories were presented to the child in the order they are illustrated in the table.

| Name of the story | Short description of the story stem |
|------------------------------|---|
| Spilled juice ⁽¹⁾ | The family is drinking juice and the child wants more and reaches across the table and spills the juice all over the floor. |
| Monster ⁽²⁾ | The children are playing in their own room and parents are watching TV in the living room. Suddenly the lights go out and the child runs into the hall and thinks there is a monster. |
| Hot Gravy ⁽¹⁾ | The family is in the kitchen and mom is making supper. The child doesn't want to wait and tries to taste and burns his/her hand. |
| Departure ⁽¹⁾ | The parents are going on a trip and the children are staying at home with the grandma, but the child doesn't want the parents to leave. |
| Reunion ⁽¹⁾ | The parents are coming back home from their trip. |
| Lost keys ⁽¹⁾ | The child hears mom and dad arguing about the lost keys. |
| Scary dog ⁽²⁾ | The child is playing with the ball in the park. The parents are watching. Suddenly a dog runs toward the child, barking. |
| Hospital ⁽³⁾ | The child is seeing a doctor with his/her parents and he/she has to stay in hospital. Then parents have to leave and go home and the child does not want to stay in hospital alone. |
| The lost dog ⁽¹⁾ | The child goes outside and discovers that the family's pet dog is missing. |

¹⁾ Stories from the original MSSB battery by Bretherton and Oppenheim 2003.

²⁾ Stories developed by Robinson et al. (unpublished, 2001).

³⁾ Story developed for this study by Latva R and Kaukonen P together with the one of the copyright holders of the method (unpublished, 2005).

The MSSB narratives were performed and video-recorded for all study children by a researcher who was blind to the birth status of the infant. Each narrative was coded according to the MacArthur narrative coding system (Robinson et al. 2004, unpublished). The coding system includes nine different theme groups (interpersonal conflict, emphatic relations, dysregulated aggression, moral themes, avoidance strategies, dissociation codes, narrative emotion codes and parental themes as well as performance codes) each consisting 4 to 14 individual themes. Of these themes only positive parental representation was used in Study IV. Positive representation of the parents was coded if the child described the parent as protecting the child from possible or actual harm, the parent taking care of the child, the parent giving concrete help, or the parent acting warmly and supportively towards the child. As all these describe various aspects of parental care we named this theme as caring representation, combining the respective theme of the mother and the father. In addition, the ability to address the conflict of the narratives was coded according to the Tampere Clinical Coding Manual (Latva et al. 2007, unpublished). The

original 0-3 scale (no response, does not address, addresses but does not resolve, addresses and resolves the story conflict) was dichotomised as those narratives in which the conflict was addressed and resolved versus all others. Each story was coded from video-tapes by one of two coders, who were blind to the child's birth status. For calculating interrater reliability, both coders coded the tapes of 20 children. The intraclass correlations of the items used in the analyses of Study IV varied between 0.72 and 0.84.

Statistical methods

In all the studies the material was described by simple frequencies as well as means (M) and standard deviations (SD), or medians (Md) and quartiles (Q₁, Q₃), as appropriate. Pairwise associations of the dependent variable and the independent variables of interest were examined by cross-tabulations with chi square or Fisher's exact test, as appropriate, as the significance test (Studies I, III, IV) or, in the case of continuous variables, by non-parametric methods (Mann-Whitney U, Kruskal-Wallis, Wilcoxon, and Spearman r ; Studies II-IV) as the distributions were non-normal. To investigate the simultaneous effects of variables on non-normally distributed variables, logistic regression analysis was applied (Studies I, II, IV). The results of the logistic regressions are reported as odds ratios (OR) and their 95% confidence intervals (95% CI). Two-tailed p -values < 0.05 are considered statistically significant, and p -values ≤ 0.10 are considered indicative and thus reported. Most of the statistical analyses were accomplished with SPSS for Windows; versions 6.0 and 9.0 in Study I, version 11.5 in Study II and version 15.0 in Studies III and IV. In Studies I and IV, the logistic regression analyses were accomplished with the LogXact program (version 4) as its exact method is the most suitable one for small case numbers.

Parental visiting frequencies were calculated separately for each individual infant, whether singleton or one of twins or triplets. Because of the wide variation in the length of the NICU periods parental visiting frequencies were calculated proportionate to the length of the respective NICU period, i.e. the total number of visiting days was divided by the number of weeks spent in the NICU (Studies I-III). The result was then multiplied by seven, thus representing the average number of visiting days per week. In Study I the information on all the NICU days was included in the average number of visiting days. In Study II the information on the first and the last NICU day were excluded as the length of these days varied considerably. When the visiting frequency of the parents in 1989 and 1997-98 was compared the average number of visiting days of Study I parents was recalculated after excluding the information on the first and the last NICU day.

The categorisations of the variables were performed so as to take into account the variability of the variables and gave suitable cell-sizes for calculations.

Regarding the visiting frequency, mothers were divided into those who visited daily (7 visiting days/week) and those visiting less than daily (0-6.99 visiting days/week).

In the MSSB, the raw score for each narrative theme was calculated as the average across all narratives. The caring representation of parents was calculated by taking the mean of the individual themes included in the composite across all narratives. The raw score of child's ability to address separation situations was calculated as the average, on the one hand across the three stories with separation-related contents, Separation, Reunion and Hospital, and, on the other hand, across all other stories. The results are presented as the proportion (%) of narratives including the caring representation composite or those showing conflict addressing ability.

In Study I, the association of parental visiting frequency with the subsequent behavioural and emotional problems of the child was investigated by cross-tabulation. Logistic regression analysis was used to find out the simultaneous effect of factors affecting children's behavioural and emotional symptoms. The analyses were completed in two stages to reduce the number of independent variables per analysis. The reliable and contextually meaningful explanatory variables were categorised appropriately as suggested by the cross-tabulations, and divided into four blocks (two for the infant, one for the mother and the family and one for the NICU period). First, a separate logistic regression analysis was completed for each block. Secondly, the variables having p -values ≤ 0.10 were entered into the final model.

In Study II, the pairwise associations of the visiting frequencies with the explanatory variables were first examined by non-parametric methods. Because the length of hospitalisation was strongly correlated with prematurity and other medical variables, the analyses were preformed separately for infants who stayed in hospital for a maximum of four weeks and for those whose stay was more than four weeks. Backward stepwise logistic regression was applied to identify the strongest explanatory variables to the parental visiting frequencies. Separate logistic regression analyses were performed for the factors affecting the visiting frequency of the mother and the father. In each analysis, the explanatory variables with $p < 0.10$ in the bivariate analysis were included.

In Study III, the differences in mother's recollections of the birth of the infant and the first encounter with the newborn between the preterm and the full-term group were examined by parametric methods. Associations of the children's behavioural and emotional symptoms with the mother's recollections and the early physical mother-infant contact and other selected explanatory variables were examined pair-wise by cross-tabulation and continuous non-parametric methods.

In Study IV, the associations of mother's recollections of the birth and first encounter with the newborn with the children's caring representations of parents in play narratives were investigated with continuous non-parametric methods. Bivariate analysis indicated that the frequency of children's caring representations was affected by factors related to both the child and mother. Therefore, a multivariate analysis was performed on the frequency of caring representations, dichotomised using the lower quartile as the cutpoint. Explanatory variables with $p < 0.05$ in the bivariate analysis (gender of the child, mother's feelings that "the baby does not belong to her") were included in a logistic regression analysis. The association of child and mother related factors and length of hospitalisation with child ability to address the separation situations in play narratives was investigated with the continuous non-parametric methods.

Ethics

The studies were approved by the Ethical Committee of Tampere University Hospital. The parents of the children gave written informed consent.

Summary of the results

Hospitalisation, visiting frequency and subsequent behavioural and emotional symptoms of the preterm child (I-III)

Visiting frequency of parents (I, II)

Mothers visited on average on 6.5 days per week in 1989 and on 6.7 days per week in 1997-98 during the NICU period. Fathers' visiting frequency was on average 5.0 days per week in 1989 and 4.8 days per week in 1997-98. Thus, mothers visited significantly more often than fathers in both samples ($p < 0.001$ in both samples). The visiting frequencies of parents are shown in Table 7.

The proportion of mothers visiting their infant daily was 41% in 1997-98 compared to 28% in 1989, but the difference did not quite reach statistical significance ($p = 0.066$). The proportion of daily visiting fathers had not increased in the last ten years; 13% of the fathers visited the NICU daily in 1989 and 10% in 1997-98.

Table 7. Visiting frequencies of the parents to preterm infants during the NICU period in Studies I and II.

| Visitor | Visiting days per week | | | | p |
|---------|---------------------------------------|----------|---------------------------------------|----------|-------|
| | 1989 (n = 47) | | 1997-98 (n = 209 ⁽¹⁾) | | |
| | Md (Q ₁ , Q ₃) | Min, Max | Md (Q ₁ , Q ₃) | Min, Max | |
| Mother | 6.5 (5.7, 7.0) | 2.3, 7.0 | 6.7 (6.1, 7.0) | 2.2, 7.0 | 0.089 |
| Father | 5.0 (3.2, 6.4) | 1.8, 6.6 | 4.8 (3.1, 6.1) | 0, 7.0 | ns |

¹⁾ One child stayed in the NICU less than one day and had no visits.

Factors affecting the visiting frequency of the mothers (I-III)

The length of the hospitalisation did not affect the visiting frequency of the mother in Study I (n = 47). However, in Study II, the sample of which was larger (n = 209), the mothers whose infants were hospitalised for a maximum of four weeks visited more frequently (Md 7.0, Q₁ 6.4, Q₃ 7.0) than the mothers whose infants stayed in the NICU longer than four weeks (Md 6.4, Q₁ 5.7, Q₃ 6.7, p < 0.001). Because the length of the hospital period was strongly correlated with the birth weight and the medical condition of the infant, factors affecting the visiting frequency in Study II were examined separately for the groups of infants hospitalised for maximum of four weeks (n = 116, 56%; Md 20, Q₁ 16, Q₃ 24) and those staying in hospital over four weeks (n = 93, 44%; Md 47, Q₁ 36, Q₃ 61).

The degree of prematurity (birth weight and gestational age) or the medical condition of the infant (the diagnoses of the infant, use of ventilator treatment, parenteral nutrition, supplementary oxygen, infant's medical risk classification) did not significantly affect the visiting frequency of the mother if the infant was hospitalised for a maximum of four weeks. More severe medical conditions of the infant, however, decreased maternal visiting frequency, if the infant stayed in hospital longer than four weeks (Table 8).

Table 8. Medical factors affecting parents' visits to the neonatal intensive care unit, when the infant stayed in the hospital for over four weeks (Study II). Only factors with p-values < 0.10 for either parent are presented⁽¹⁾.

| Medical factors | Visiting frequency (days/weeks) | | | |
|----------------------|---------------------------------------|-------|---------------------------------------|----|
| | Mother | | Father | |
| | (n = 93) | | (n = 93) | |
| | Md (Q ₁ , Q ₃) | p | Md (Q ₁ , Q ₃) | p |
| Gestational age | | 0.088 | | ns |
| < 32 weeks (n = 57) | 6.3 (5.3, 6.7) | | 4.3 (3.1, 6.1) | |
| ≥ 32 weeks (n = 36) | 6.4 (6.1, 6.8) | | 4.7 (3.0, 5.9) | |
| IVH, NEC or BPD | | 0.055 | | ns |
| Yes (n = 46) | 6.3 (5.2, 6.7) | | 4.4 (2.9, 6.0) | |
| No (n = 47) | 6.5 (6.1, 6.8) | | 4.6 (3.1, 5.9) | |
| Ventilator treatment | | 0.048 | | ns |
| Yes (n = 57) | 6.2 (5.1, 6.7) | | 4.3 (2.7, 6.0) | |
| No (n = 36) | 6.5 (6.1, 6.8) | | 4.6 (3.1, 6.0) | |
| Parenteral nutrition | | 0.041 | | ns |
| Yes (n = 8) | 6.4 (5.6, 6.7) | | 4.5 (3.0, 5.8) | |
| No (n = 85) | 6.8 (6.3, 7.0) | | 5.2 (3.8, 6.5) | |

¹⁾ Other factors tested were gender of the infant, birth weight (< 1500 g / ≥ 1500 g), use of supplementary oxygen (yes/no), Bronchopulmonary dysplasia (yes/no), and infant's medical risk classification (low risk: birth weight ≥ 1500 g and no IVH, BPD or NEC / very low birth weight, stable: < 1500 g and no IVH, BPD or NEC / high risk: one or more of the diagnosis IVH, BPD or NEC).

The distance from hospital to home affected the visiting frequency of the mothers irrespective of the length of infant hospitalisation. Other children in the family affected only the visiting frequency of those mothers whose infants stayed in hospital for longer than four weeks. Other family factors (marital status, age of the mother) were not associated with the visiting frequency of the mother (Table 9).

To investigate the simultaneous effects of the medical and family factors suggested by the bivariate analyses (gestational age, diagnoses of IVH, NEC or BPD, use of ventilator or parenteral nutrition, distance from hospital to home and siblings) on the maternal visiting frequency, multivariate analyses were performed, separately for groups defined by the length of hospitalisation (≤ 4 weeks, > 4 weeks). For mothers whose infants stayed in hospital for a maximum of four weeks, a long distance from hospital to home remained a significant risk factor for lower visiting frequency, increasing the risk for lower visiting threefold (OR 3.0, 95% CI 1.3-7.4). For the mothers whose infants stayed in the hospital longer, lower gestational age (OR 6.4, 95% CI 1.5-18.9) and longer distance from hospital to home (OR 16.6, 95% CI 5.1-54.0) were the strongest risk factors for lower maternal visiting frequency.

Table 9. The family factors affecting parents' visits to the neonatal intensive care unit in Study II. Only factors with p-values < 0.10 for either of parents are presented¹⁾.

| Family factors | Visiting frequency (days/week) | | | |
|---|---------------------------------------|-----------|---------------------------------------|-----------|
| | Mother (n = 209) | | Father (n = 209) | |
| | Md (Q ₁ , Q ₃) | p | Md (Q ₁ , Q ₃) | p |
| <i>Infant hospitalised for ≤ 4 weeks</i> (n = 116) | | | | |
| Distance from hospital to home | | 0.001 | | 0.001 |
| ≤ 30 km (n = 85) | 7.0 (6.7, 7.0) | | 5.3 (3.8, 6.6) | |
| > 30 km (n = 31) | 6.5 (5.5, 7.0) | | 3.5 (2.2, 5.2) | |
| Siblings | | ns | | < 0.001 |
| Yes (n = 43) | 7.0 (6.1, 7.0) | | 3.5 (2.3, 5.0) | |
| No (n = 73) | 7.0 (6.6, 7.0) | | 5.4 (4.0, 6.7) | |
| <i>Infant hospitalised for > 4 weeks</i> (n = 93) | | | | |
| Distance from hospital to home | | < 0.001 | | < 0.001 |
| ≤ 30 km (n = 62) | 6.5 (6.2, 6.8) | | 5.3 (3.7, 6.1) | |
| > 30 km (n = 31) | 5.6 (4.4, 6.5) | | 3.3 (1.6, 4.4) | |
| Siblings | | 0.022 | | ns |
| Yes (n = 66) | 6.1 (3.6, 6.7) | | 4.0 (1.3, 5.7) | |
| No (n = 27) | 6.4 (6.1, 6.8) | | 4.8 (3.3, 6.1) | |

¹⁾ Other factors tested were marital status (parents living together / not living together) and age of the mother (≤ 26 / > 26).

Interestingly, the maternal visiting frequency was also associated with the mother's experience of the first encounter with the preterm newborn in the delivery room before admission to the NICU ($n = 28$; Study III). Mother's negative recollection of the first encounter was associated with a lower visiting frequency of the mother. The median visiting frequency was 6.3 days per week (Q_1 5.6, Q_3 6.5) if the mother's recollection of the first encounter was negative compared to 7.0 days per week (Q_1 6.5, Q_3 7.0) if the experience had been positive, ambivalent or neutral ($p = 0.016$). Neither shorter gestational age nor the medical condition of the infant was statistically significantly associated with frequency of maternal visiting in Study III. On the other hand, mother's negative experience of the birth of the infant was not statistically significantly associated with the maternal visiting frequency.

Factors affecting the visiting frequency of the fathers (I, II)

The length of hospitalisation was not associated with lower visiting frequency of the father in the study sample of either 1989 or 1997-98. Nevertheless, factors affecting the visiting frequency were examined separately in the groups defined by the length of hospitalisation similarly as among the mothers.

The degree of prematurity and medical condition of the infant did not affect the visiting frequency of the father regardless of the length of hospital stay (Table 8). Fathers visited less frequently if the distance from hospital to home was longer than those with a shorter distance both if the infant stayed in hospital for a maximum of four weeks ($p = 0.001$) or over four weeks ($p < 0.001$). Other children in the family affected only the visiting frequency of those fathers whose infants stayed in the hospital a maximum of four weeks ($p < 0.001$; Table 9).

In a multivariate analysis, with siblings and distance from hospital to home as explanatory variables, siblings appeared to be the strongest risk factor (OR 5.0, 95% CI 1.3-13.9) for lower visiting frequency of the fathers whose infants stayed in hospital for no more than four weeks. For fathers whose infants stayed in hospital for over four weeks the only pairwise significant factor, longer distance from hospital home, increased the risk of lower visiting frequency almost 18-fold (OR 17.8, 95% CI 2.2-145.3) (II).

Effects of maternal visiting frequency and hospitalisation on behavioural and emotional symptoms of the preterm child (I)

According to CBCL completed by the mothers behavioral and emotional symptoms (total T score) on at least the sub-clinical level, according to the definition by Achenbach (1991), were found in 21% ($n = 10/47$, 4/23 boys and 6/24 girls) of the preterm children at seven to eight years of age. Six children had symptoms on the clinical level and four on the sub-clinical level. Internalising

symptoms on at least the subclinical level were found in 23% ($n = 11/47$) of the preterm children and externalising symptoms in 15% ($n = 7/47$) of the children. There were no statistically significant differences between girls and boys in the maternal assessment.

Maternal visiting frequency in the NICU during the hospital period was associated with the child's subsequent emotional and behavioural symptoms. None of the preterm children whose mothers had visited the hospital daily when the child was newborn had emotional and behavioural symptoms according to CBCL total T scores at seven to eight years of age compared to 29% of the children whose mothers had visited less frequently ($p = 0.043$; Figure 3). A similar association was seen in internalising symptoms ($p = 0.021$; Figure 3).

When the effect of maternal visiting frequency was adjusted for, other predicting factors (prematurity, medical condition of the infant, family issues, and the length of hospitalisation) mother's daily visiting seemed to offered protection against the existence of the behavioural and emotional symptoms according to CBCL total T scores at seven to eight years of age compared to less frequent visits ($OR = 0.2$, $p = 0.074$; 95% CI 0-1.2). Length of early mother-infant separation due to hospitalisation also seemed to be associated with preterm child's CBCL total T scores; hospitalisation longer than one month ($n = 13$) resulted in a 5.5-fold risk ($OR = 5.5$, $p = 0.095$; 95% CI 0.8-46.9) compared to a maximum of one month of hospitalisation ($n = 34$).

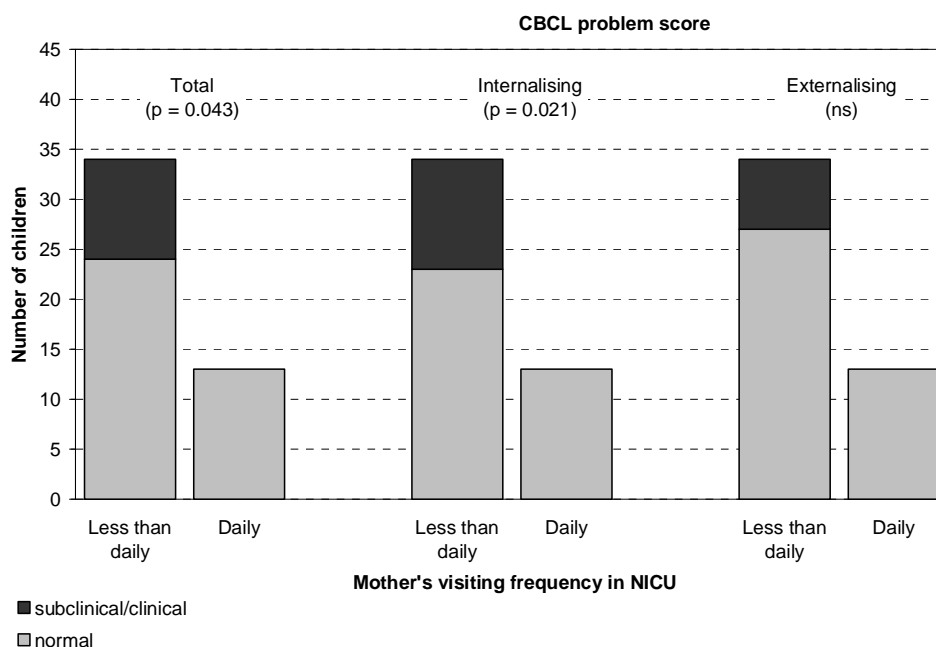


Figure 3. Association of mother's visiting frequency with preterm child's emotional and behavioural symptoms at seven to eight years of age ($n = 47$).

Mother's recollections of the birth and the behavioural and emotional symptoms of the preterm infant (III, IV)

Mother's recollection of the birth of the preterm infant (III)

Mothers of preterm children had more negative recollections of the birth of the infant than mothers of full-term children. A total of 46% of the mothers of preterm children compared to 10% of the mothers of full-term children had negative recollections five to six years after the delivery ($p < 0.001$). Among mothers of preterm infants, the negative recollections were still highly emotionally evocative for some mothers after five to six years. Among the mothers of preterm infants, the structure of the recollections was often incoherent including repetition, unfinished utterances, speech fillers, disorganised and unfinished thoughts. In addition, the mothers described more negative experiences during labour, such as feelings of fear, helplessness, anxiety and panic.

In the preterm group, shorter gestational age was associated with negative maternal recollections of the birth of the infant ($p = 0.025$, Figure 4) but not the birth weight of the infant. Neither the medical condition of the infant, nor birth by caesarean was statistically significantly associated with of the maternal recollections.

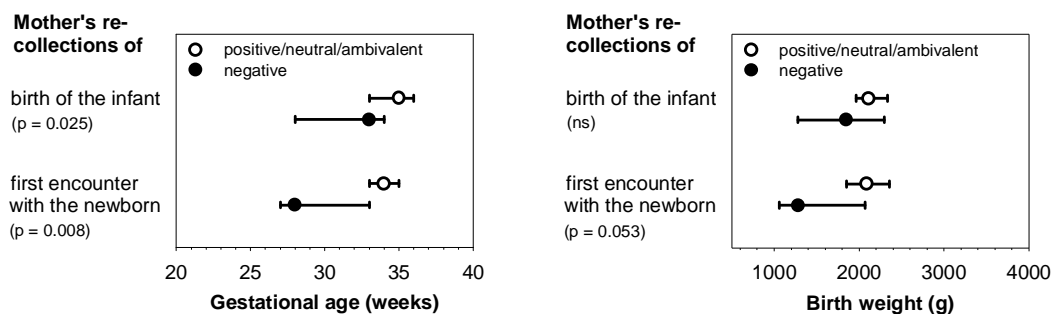


Figure 4. Median and quartiles of the gestational age and birth weight of the preterm infants with either positive or negative maternal recollections.

Mother's recollection of the first encounter with the preterm infant and early physical mother-infant contact (III, IV)

The mothers of preterm children had fewer positive recollections of the first encounter with the newborn than did the mothers of full-term children. A total of 18% of the mothers of preterm children but none of the mothers of full-term children had negative recollections five to six years after the birth of the infant ($p = 0.010$). Mothers of preterm infants often reported only that the baby was taken away from them. However, the recollections of the first encounter with the preterm newborn were mainly coherent, although the description was somewhat exiguous.

Shorter gestational age was associated with mother's negative recollections of the first encounter with the newborn preterm infant ($p = 0.008$, Figure 4). In addition, there was an association between the medical condition and negative maternal recollection about the first encounter with the infant: a total of 9% of the mothers of low risk infants had negative recollections compared to 60% of the mothers of high-risk infants ($p = 0.027$). There was also an indicative association between the birth weight of the infant and mother's negative recollections of the first encounter with the infant ($p = 0.053$). Infant's birth by caesarean was not statistically significantly associated with the maternal recollections of first encounter with the infant.

Mother's first encounter with her newborn infant included an early physical mother-infant contact prior to admission to the NICU in ten out of 28 (36%) mother-infant pairs. Shorter gestational age and lower birth weight did not explain the occurrence of early physical mother-infant contact prior to admission to the NICU. There was, however, an indicative association between the infant's medical condition and the existence of an early physical contact ($p = 0.087$).

The lack of the early physical contact prior to admission to the NICU was associated with the mother's feeling that "the baby does not belong to her" during the infant's hospitalisation. All seven mothers (out of 28, 25%) who had had the feeling that the baby does not belong to them were mothers who had not had an early physical contact with their infant (39% of these mothers). None of the mothers who had had a physical contact with their infant had had such a feeling ($p = 0.030$). Mother's feeling that "the baby does not belong to her" was not associated with the infant's birth weight, gestational age, medical condition or length of hospitalisation.

Associations between the mother's recollection of birth-related factors and the behavioural and emotional symptoms of the preterm child (III)

Preterm children had more total and externalising symptoms than full-term children according to the CBCL completed by the mother at five to six years of age. The median total raw score was 22 (Q₁ 13, Q₃ 29) in full-term and 33 (Q₁ 22, Q₃ 39) in preterm children ($p = 0.006$); the respective values for externalising scores were 8 (Q₁ 5, Q₃ 13) and 12 (Q₁ 7, Q₃ 16; $p = 0.048$). Internalising symptoms showed no statistically significant difference between the groups. There were no statistically significant differences between girls and boys in the maternal assessment.

Mother's recollection of the birth and first encounter with the preterm infant was associated with the child's concurrent behavioural and emotional symptoms at five to six years of age. Those preterm children whose mothers had negative recollections of the birth of the infant had more internalising symptoms ($p = 0.029$; Figure 5). Mother's negative recollection of the first encounter with the preterm newborn was associated with increased total CBCL problem score of the preterm child ($p = 0.007$, Figure 5). The CBCL total raw score of the preterm child was not associated with birth weight, gestational age or medical condition of the preterm infants.

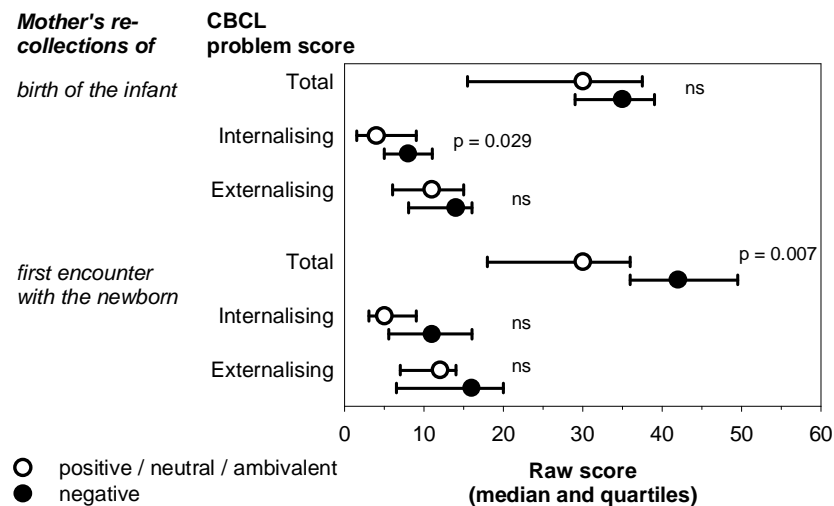


Figure 5. Association of mother's recollections of the birth of the infant and first contact with the newborn on preterm child's behavioural and emotional symptoms at five to six years of age.

In full-term children, mother's recollections of the birth experience and the first encounter with the newborn were not statistically significantly associated with the behavioural and emotional symptoms of the children at five to six years of age.

Interestingly, the lack of the early physical contact prior to admission to the NICU between the mother and the newborn was associated with the preterm child's subsequent behavioural and emotional symptoms at five to six years of age. When the child had had early physical contact with his/her mother prior to admission to the NICU, the median CBCL total raw score was 24 (Q₁ 17, Q₃ 32) compared to 35 (Q₁ 29, Q₃ 41) for the rest of the children ($p = 0.024$).

Preterm child's ability to address separation situations and child's representation of the parents in play narratives (IV)

Effects of early mother-infant separation due to hospitalisation on child's ability to address separation situations (IV)

At five to six years of age, there were no statistically significant differences between preterm and full-term children in the children's ability to address the conflict in separation stories in MSSB play narratives (three stories out of nine included separation themes). The median proportion of separation narrative conflicts addressed in preterm children was 84% (Q₁ 66, Q₃ 100) compared to 100% (Q₁ 66, Q₃ 100) in full-term children. There were no statistically significant differences in children's ability to address separation situations between the girls and boys.

Among preterm children, however, the length of early mother-infant separation due to hospitalisation was associated with the child's difficulty to address separation situations in play narratives. Preterm children who had stayed in the hospital for longer than 30 days had more difficulties in addressing the conflict in the separation stories than children whose hospital stay had been shorter ($p = 0.010$). In children hospitalised for a maximum of 30 days, the median proportion of separation narratives with addressed conflict was 100% (Q₁ 66, Q₃ 100) compared to 43% (Q₁ 25, Q₃ 75) in children hospitalised for longer than 30 days. The length of the hospital stay did not, however, affect the preterm children's ability to address the conflict of the other stories.

Child's developmental problems requiring speech/physio/occupational therapy ($n = 6/28$) at five to six years of age according to the mother were used in the analysis as a better indicator of the long-term development of the child than the degree of prematurity. One half of these children had birth weight under

1500 g and the other half over 1500 g ($p = 0.050$). These developmental problems were not associated with the children's ability to address the conflicts of the separation stories or other stories.

Associations between the mother's recollection of birth-related factors, early mother-infant separation and child's caring representations (IV)

There was no statistically significant difference in the frequency of caring representation between preterm and full-term children at five to six years of age. The median proportion of narratives including caring representations in preterm children was 20% (Q_1 7, Q_3 41) compared to 38% (Q_1 13, Q_3 47) in full-term children. Among all children, girls had a higher proportion of caring representations than boys; among girls the median proportion of narratives including caring representations was 40% (Q_1 27, Q_3 52) compared to 12% (Q_1 6, Q_3 40) among boys ($p < 0.001$).

The mother's recollection of the first encounter with the preterm newborn showed no association with the caring representations of parents in children's play narratives when the children were five to six years of age. However, those children whose mothers had had the feeling that "the baby does not belong to her" during the hospitalisation had fewer caring representations than children whose mothers did not have such feelings ($p = 0.026$; Figure 6).

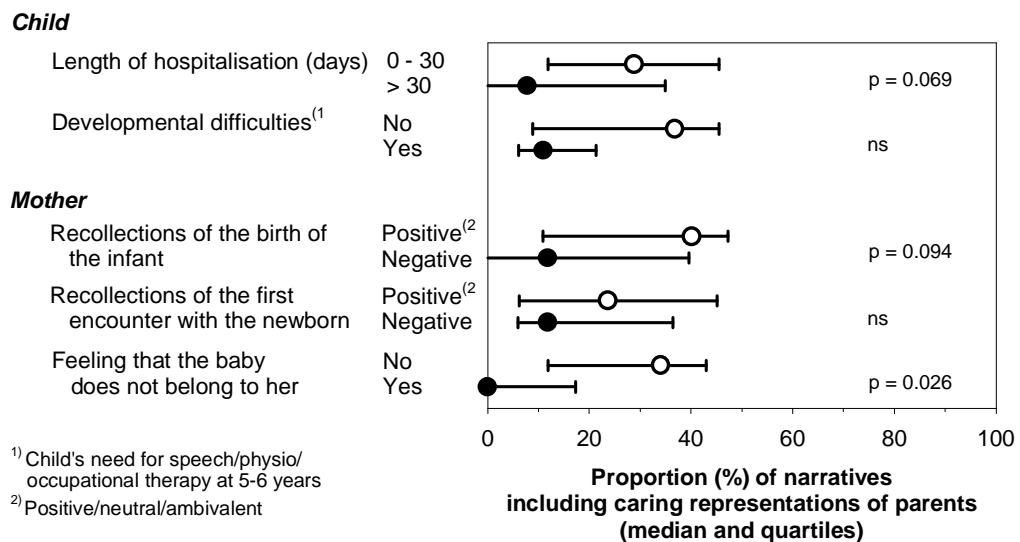


Figure 6. Association of the factors related to child and mother with preterm child's caring representation of the parents in the play narratives at five to six years of age.

The length of early mother-infant separation due to hospitalisation of the preterm infant was also inversely associated with the preterm child's caring representations in the MSSB play narratives, but the association did not quite reach statistical significance ($p = 0.069$). The birth weight or medical condition of the preterm infant was not associated with the proportion of caring representations. In addition, the child's developmental problems requiring speech/physio/occupational therapy ($n = 6/28$) at five to six years of age were not associated with the proportion of caring representations.

The simultaneous effects of two significant factors (mother's feeling that "the baby does not belong to her" and the gender of the child) on the frequency of child's caring representations were investigated by multivariate analysis. The analysis showed that mother's feelings that "the baby does not belong to her" was the only significant risk factor for a lower proportion of caring representations in the preterm child's play narratives (asymptotic OR 8.4; $p = 0.041$, 95% CI 1.1-63.9, exact OR 6.8; $p = 0.105$, 95% CI 0.7-94.9).

Summary of findings

Preterm birth is a complex situation that affects early motherhood and may also have long-term effects on the development of the mother-child relationship and the child. In this dissertation, the associations were explored between mother's experiences of the preterm birth, early hospitalisation of the infant, visiting frequency of the mother in the NICU, the preterm child's subsequent behavioural and emotional symptoms, and his/her narrative representations. The main associations ($p < 0.05$) found in Studies I-IV are presented in Figure 7.

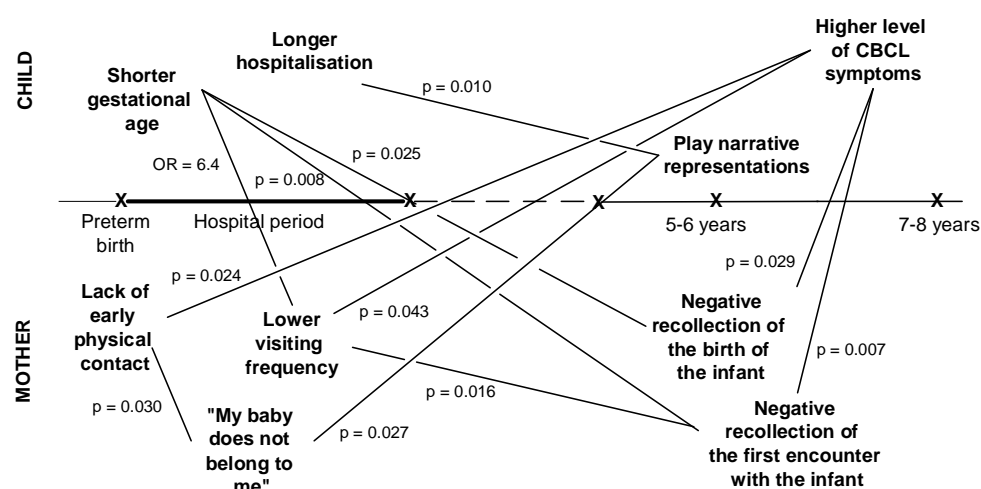


Figure 7. Main associations found in Studies I-IV.

Discussion

Strengths and limitations

Study design

This study was designed to approach the study questions from different perspectives: to collect information from the hospital records and from the mother, but also to give the child an opportunity to tell his/her own experiences. The study combines questionnaire-based, interview and observational research methods. This kind of study design also provides an opportunity to gather broad information from a large number of study subjects but also makes it possible to obtain a more profound understanding of the issues in focus among a smaller subgroup. In child psychiatric research it has been more common to study the research questions solely from the perspective of the parents; only few studies have included the assessment of small children's own experiences.

The retrospective study design gives an opportunity to compile an extensive early hospitalisation history from a large study population with moderate research resources. On the other hand, the time-consuming interview and observation methods used in the cross-sectional part of the study could not be used in the whole study population. However, from the larger study population it was feasible to select a sub-sample for these more laborious methods.

Sample

The study included an unselected group of preterm infants with a wide range of gestational ages. Such a study sample was selected to represent a large variety of preterm children and to be able to assess different kinds of issues affecting the visiting frequency of the parents. In addition, it enabled us to evaluate the mother's experiences of the preterm birth independently of the degree of prematurity. The heterogeneous sample of preterm infants also enabled assessment of early mother-infant separation due to shorter and longer hospitalisation and its effects on behavioural and emotional development of the preterm child.

The first study was a hypothesis-generating study and the sample was relatively small, but representing preterm children who were born in one year in

the Tampere area. After finding a significant association between mother's daily visits and child's subsequent behavioural and emotional symptoms, a new study using more detailed methods to explore related maternal and child experiences was designed. Although the studies using time-consuming methods included only 68 children, we proved that this sub-sample did not differ significantly from the original sample regarding the background information. In addition, comparing the size of the sub-sample to most of the studies using the same kind of interview or play narrative methods, the sample size can be considered to be of medium size (Holmberg et al. 2007).

Methods

The information was collected from the hospital records and self-reports completed by the mother, by interviewing the mother and assessing the play of the child. Two important new methods, the Clinical Interview for Parents of High-Risk Infants (Meyer et al. 1993) and the MacArthur Story Stem Battery (Bretherton and Oppenheim 2003) were applied, neither of which have been used before in published research in Finland, even though the methods have been in clinical use.

Information was collected from the hospital records to assess visiting frequency. This kind of method gives an opportunity to collect quite easily and reliably information on all premature infants treated in the NICU during two years of the study. The visiting frequency during the whole period of the infant's hospitalisation has been collected in only few studies. All visits of the parents were systematically and clearly marked as the NICU nurses documented parental visiting as a part of nursing logs. Nurses' records of parental visiting frequency are the most common way to collect information. Factors affecting parental visiting were also collected from the hospital records limiting the factors to those that could be found in the hospital records.

The CBCL used to assess behavioural and emotional symptoms of the child is a validated and internationally widely used questionnaire to screen children's behavioural and emotional symptoms. Parents are the common source of information when evaluating children's mental well-being, both in research and clinical work, because they can make observations of child's behaviour in different daily life situations. The fact that the child's behavioural and emotional symptoms were assessed only by the mother can be seen as one limitation of the study as the perceptions of mother may be affected by her emotional distress (Zeanah et al. 1997). However, the mother is the main source of information on the child's behaviour in clinical work as well as in research. In fact, mother's concern is generally needed to bring a child to clinical attention for behavioural problems.

The interview and observational methods were used to enhance the understanding of the study issues. The mother's experiences of the birth of the infant were evaluated by semi-structured interview retrospectively five to six years after the birth of the child. The time interval can be seen as a limitation because of a recall bias. However, assessing mother's experience of birth of the infant retrospectively provides the advantage of getting a more enduring view of the mother's experience, which in the long term is more relevant to the parenting of the preterm child. When assessing the recollections of the mother, it is important to consider if there are factors currently affecting the recollections. One possible factor is mother's current mental state, such as depression, which may affect the mother's memories of the birth of the child. In this study, the potential effects of mother's depressive symptoms could not be demonstrated because there were only three out of 68 mothers with depressive symptoms in the study group. This, on the other hand, practically eliminated the confounding effects of maternal depression in this study. Other possible factors affecting the mother's recollections could include the child's current behavioural problems. In that case, the association between the mother's negative recollections of the birth and children's behavioural and emotional symptoms might also have been found in the full-term group. However, no such association was found in this study.

Play narrative method was used to give the child an opportunity express about his/her own thoughts and feelings regarding relationships and separation situations. During the last decade there has been growing interest in small children's own perceptions of their experiences. Play narrative methods have been proved to be one way to evaluate young children's thoughts and feelings (Emde 2003). However, there are no previous published play narrative studies among preterm infants, although play narrative methods have been used in different kinds of child samples. Compared to studies using only the parent's perception of the child's symptoms, using the child's own perspective provides us with a valuable way to assess the child's own feelings.

Hospitalisation, visiting frequency and subsequent behavioural and emotional symptoms of the preterm child

Visiting frequencies of the parents

The importance of parents' visiting and participation in the care of their preterm infant during hospitalisation in the NICU has been recognised for a long time. Nowadays there are liberal visiting policies for the parents in most western countries (Cuttini et al. 1999) whereas 30 years ago the visiting of the parents were restricted in specific visiting hours. Liberal visiting policies in the NICU started to become more common during the 1980s, and it has been one of the

most important factors that explain the increase in visiting frequencies. However, visiting frequency of the parents only started to increase in the 1990s. The delay may be explained by non-supportive atmosphere for the parents' visiting until the NICU staff became familiar and approving towards liberal visiting policies by increasing their knowledge about the importance of parent's participation in their infant's care. The encouragement of the parents by the doctors and nurses is crucial. In this study, the parents in the study cohorts of both 1989 and 1997-1998 visited the NICU more often than in most studies conducted before 1995 (I, II, Table 2). In the study hospital, liberal visiting policy started in 1985, so all parents who included in both study samples have had the opportunity to visit in the NICU freely and participate in the care of their infant. At the same time as the NICU started to be open to parents, the intensive care of preterm infants developed to be more effective and the improved survival of the infants has further encouraged parents to participate in the care of their preterm infants.

All studies so far have shown that mothers visit more often than fathers (Levy-Shiff et al. 1990, Callahan et al. 1991, Reid et al. 1995, Franck and Spencer 2003). Similarly, this study showed that mothers visited more frequently than fathers (I, II). Maternity leave gives mothers an opportunity to concentrate on the infant, so the mother had more time to visit the hospital. The mothers' visiting frequency showed a slight tendency to increase between the two studies (I, II) but the fathers' visiting frequency remained the same between the two study cohorts. It may be that the changes in the supportive atmosphere for the parents' visiting invoke a more sensitive reaction in mothers than father. During the preterm infant's hospitalisation probably more practical issues affect the visiting frequency of the fathers, and therefore no such trend was found among fathers.

When studies on visiting frequencies are compared, it is important to take into account the time interval when the data was collected. In this study, the visiting frequency was assessed during the whole hospital period for a more complete picture of parent's visiting while most earlier studies assessed only the first weeks of hospitalisation. Using the visiting frequency of the first weeks may give a higher frequency of parental visiting than assessing the whole hospital period, because the length of the hospitalisation has been shown to decrease the visiting of the parents (Lewis et al. 1991, Franck and Spencer 2003). This phenomenon was also shown in this study (II). Only four earlier studies have assessed the visiting frequency of the mother during the whole hospital period. In two studies published in the 1980s, the visiting frequency of the mother was very low with an average of only one visit per week (Rosenfield 1980, Zeskind and Iacino 1984). In one study published in 1990, the visiting frequency of the mother was an average of 4.3 visits per week and that of the father an average of 3.3 visits per week (Levy-Shiff et al. 1990). In a recent study mother's presence in the NICU were evaluated during the whole hospital period and the mean duration of time that mothers spent with their infants in the NICU was 2.5hour/day (Erdeve et al. 2009).

Lower socioeconomic status has been found to decrease the parents visit in earlier studies (Brown et al. 1989, Lewis et al. 1991). In this study, we did not have the opportunity to analyse the effect of SES on visiting frequency. However, the fairly homogeneous population and the high educational level in Finland might be one possible explanation for the higher visiting frequency in this study compared to earlier reports. Single parenting has also been found to decrease the parents' visits (Brown et al. 1989, Lewis et al. 1991). Consistently with the population in Finland, in the study sample there were only few single mothers in this study. Cultural background factors need to be considered when comparing the differences between studies carried out in other cultures or countries.

Issues affecting the visiting frequency of the parents

In this study the factors associated with the lower parental visiting frequency were mainly similar to those reported in other studies. However, this is the only study to take account the simultaneous effect of the various factors affecting the visiting frequency of the parents. When different factors were explored simultaneously, the strongest risk factors for mother's lower visiting frequency were longer distance from hospital to home and lower gestational age of the infant (II). For fathers the strongest risk factors are other children in the family and a longer distance from hospital from home (II).

Although parents who live further away from the hospital visit less frequently, those parents probably spend more time in the hospital during one visit than parents who visit more often. This was shown by Callahan et al. (1991), who reported less frequent visits by parents who lived further away but no differences in the total visiting time in the NICU compared to the parents who lived near the hospital, because those parents who lived further away stayed longer in the NICU at each visit. It is not known whether, from the infant's perspective, less frequent visits with similar total visiting time are as good as more frequent but shorter visits. Because frequently repeated caring situations with a parent are the cornerstone of the development of the infant (Stern 1998), it can be argued that frequent, regular visits by the mother are more important than the total visiting time for the development of the mother-infant relationship and of the infant, if the mother has no opportunity to stay with her infant in the hospital.

In this study, one practical factor that affected parental visiting frequency was the presence of older siblings (II), but in contrast to other studies (Lewis et al. 1991, Franck and Spencer 2003) the presence of other children affected only in the visiting frequency of the father. This finding may be explained by the different parental roles in the family. Nowadays fathers have a more active role in the families including more involvement in childcare in everyday life and

probably the father's role in caring for the other children is emphasised when the new baby in the family needs hospital care. Thus, it is likely that fathers take care of the other children in the family at home while the mother participates in the care of the new preterm infant in the hospital.

A new finding of this study was that the length of gestational age of the infant has the strongest effect on mother's visiting frequency when all the factors affecting the visiting were analysed simultaneously (II). There are only a few studies that have examined the effect of prematurity and the medical condition of the infant on maternal visiting. Even those studies are contradictory. In Callahan et al. (1991) study, the birth weight of the infant was not associated with mothers' visiting in the NICU, whereas Reid and her colleagues (1995) reported that the mothers of the 'sicker' infants visited less frequently. Mothers of more premature infants may have more difficulties in maternal attachment, and this may be seen as lower motivation to participate in the care of infant during the hospital period. One possible explanation for the finding is that mothers of more premature infants may have more fears about losing the baby than mothers of less premature infants. Mothers may also have feelings of guilt for having a preterm infant. Interestingly, a negative recollection of the first encounter with the infant in the delivery room was also associated with fewer visits to the NICU by the mother (III). As shorter gestational age, lower birth weight or medical condition of the infant were not associated with maternal visiting in Study III, it seems that rather mother's negative experience of the first encounter with the infant than the prematurity of the infant affects the visiting frequency. The negative experience with the newborn may result in difficulties in the maternal attachment process, and produce feelings of insecurity, disappointment and fear in the mother making her reluctant to visit her infant in the NICU.

The prematurity or medical condition of the infant was not associated with the visiting frequency of the father in this study. The birth of a preterm infant is certainly a stressful time for both parents, but fathers seem to cope with the situation differently than mothers. In the study by Miles and her colleagues (1991), mothers experienced more stress related to alterations in the expected parental role than fathers; mothers also reported the NICU environment to be more stressful than fathers. Overall, knowledge about father's role and experiences is scarce and the lack of research on fathers may give an underestimated picture about their roles in the care of a preterm infant.

Early separation due to hospitalisation and behavioural and emotional symptoms of the preterm child

Early separation due to the hospitalisation complicates the development of close contact and early interaction between the preterm infant and his/her mother. According to the indicative results of Study I the length of early separation due to hospitalisation was associated with the behavioural and emotional symptoms

of preterm children at the age of seven to eight years. However, the more important finding was that the visiting frequency of the mother was associated with later behavioural and emotional symptoms of the preterm child (I). Specifically, daily visits by the mother were associated with fewer clinically significant behavioural and emotional symptoms of the child at seven to eight years of age.

Less than daily visiting by the mother during the hospitalisation may reflect underlying factors influencing early mother-infant interaction which may have long-term effects on the mother-child relationship. Studies have shown that low socio-economic status, single parenting and younger maternal age are risk factors for lower visiting frequency (Brown et al. 1989, Lewis et al. 1991) and these factors also increase the risk for the development of the mother-child relationship and the socio-emotional development of the child (Zeanah et al. 1997). However, in this study these risk factors were missing. Instead, preterm birth and early separation may, through an increased risk of difficulties in the development of maternal attachment and the mother-child relationship, affect the visiting frequency of the mother and subsequent socio-emotional development of the child. Another mediating factor may be that early separation causes more maternal psychological distress after the birth of the preterm infant (Davis et al. 2003, Drewett et al. 2004, Kersting et al. 2004, Korja et al. 2008b) which may be a reason for infrequent visits of the mothers. In addition, early separation itself may have a negative influence on the development of the mother-infant relationship (Feldman et al. 1999). Altogether, the frequency of maternal visits to the NICU seems to be at least a marker of risk for later behavioural and emotional problems. This finding highlights the importance of increased attention and early interventions for those mothers who visit infrequently their preterm infants.

Early mother-infant separation due to hospitalisation of preterm infants is still inevitable for most mothers, because in most NICUs mothers cannot stay with their infants. Because of that it is very important to alleviate the mother-infant separation distress in every possible way. One significant intervention to compensate the separation experience during the hospital period of the infant is the Kangaroo mother care, which has been proven to be beneficial for both the mother and the infant (Tessier et al. 1998, Feldman et al. 2003, Tessier et al. 2003). Family-centered care emphasises the importance of parents' continual presence and nowadays in some NICUs, there are family rooms, where the parents can spend time and participate in the care of the infant as much as possible during the infant's hospitalisation (Griffin 2006). It is important to study how these family rooms affect child's and mother's separation experiences. In addition, it is important to minimise the length of the hospitalisation by optimising the care of the preterm infant (Korvenranta et al. 2007).

Mother's recollections of the birth of the preterm infant and the behavioural and emotional symptoms of the child

Mother's recollections of the birth of the preterm infant

Negative and traumatic delivery experiences are more common among mothers of preterm than full-term infants (Kersting et al. 2004, Waldenström et al. 2004). This can be partly explained by the interruption of the psychological process of prenatal development of motherhood. In a preterm delivery, the mother has to give a birth to a baby when she is psychologically unprepared for the delivery and to become a mother of a newborn infant (Stern and Bruschweiler-Stern 1998). Difficulties in this transition process may expose mothers to experience the birth of the infant more negatively. In addition, medical complications, feelings of lack of control and dissatisfaction with the care during the labour have been shown to be associated with the mother's negative of traumatic delivery experiences (Wijma et al. 1997, Creedy et al. 2000, Czarnocka and Slade 2000, Waldenström et al. 2004) and these factors are more common during preterm delivery. Furthermore, fears about the health of the newborn are common among mothers of preterm infants, and increase maternal distress even more. Therefore it is natural that the mothers of preterm infants more often experience the delivery negatively. However, it is not known how long the negative recollections may last. In an unselected group of mothers, negative experiences of the birth of the infant have been shown to extend up to the second year after the delivery (Waldenström 2003, Stadlmayr et al. 2006). In this study the mother's recollections of the birth of the preterm infant were still more negative five to six years later than mother's of full-term infants (III). Most importantly, for some mothers those recollections were still highly emotionally evocative.

Long lasting negative experience of the birth of the infant may be more common among mothers of preterm infants because there are many major sources of stress during and after the birth of a preterm infant such as concern about the infant's survival and health, alterations in the motherhood and separation from the infant (Miles et al. 1991), which will make the first months with the child more complicated. These multiple stressors may offer an explanation for the persistence of mother's negative experience of the birth of the preterm infant. In addition, the birth of a preterm infant is a complex traumatic event and the mother's concerns about her child's health and development may persist for years. Mothers are confronted every day with this continuing traumatising reality while caring their preterm child, as also speculated by Kersting and colleagues (2004). This kind of complex traumatic event may cause long-lasting traumatic stress after a preterm delivery. This explanation is supported by the study by Burger and colleagues (1993), reporting that a psychological trauma related to a complicated pregnancy and to a preterm

birth have a long-term influence on the mother's concerns about her child and also affect the way she perceives her child.

Early physical mother-infant contact

Early skin-to-skin contact at birth or soon afterwards between the mother and her full-term newborn is standard practice in many countries, and there are also units that support early physical contact between the mother and her preterm infant. In Tampere University Hospital standard practice for preterm infants did not include early psychical contact prior to admission to the NICU in 1998. In Study III, one third of the mothers of preterm infants had an early physical contact with their newborn before the infant's admission to the NICU (III). The brief early physical contact was only indicatively associated with the degree of prematurity or the medical condition of the infant. There is no previous information about the occurrence of physical mother-infant contact before admission to the NICU in preterm infants. In this study even a brief early physical mother-infant contact prevented the mothers feeling that "the baby does not belong to them" among mothers of preterm infants (III).

In a recent Cochrane review, early skin-to-skin contact of a mother and a full-term infant starting less than 24 hours after birth has been proven to have a beneficial effect on maternal attachment (Moore et al. 2007). Among mothers of preterm infants this has not been studied although these mothers are at greater risk on delay or difficulties in maternal attachment due to the preterm labour, mother-infant separation and psychological distress of the mothers (Feldman et al. 1999). In addition, early physical mother-infant contact may be more important to the development of maternal attachment among the mothers of preterm infants because of disruption of development of the prenatal attachment. When the preterm birth occurs on a representational level, the schema of the baby-to-be is still rich in a mother's mind and the discrepancy with the real baby is distinct (Stern 1998). Early physical mother-infant contact may facilitate the mother to reconcile the baby of her imagination with the real newborn preterm baby facilitating the development of maternal feelings and attachment. The importance of the early mother-infant physical contact was also emphasised in the study by Redshaw and colleagues (1997) in which the lack of physical mother-infant contact during the first 24 hours after the birth of the preterm infant was associated with the mother's feelings that their baby did not belong to them two months after discharge from NICU. It is possible that the mother's chance to see and hold her infant before infant's admission to the intensive care unit also relieves the mother of her worst fantasies about the infant's condition or appearance (Klaus et al. 1995). Franck and colleagues (2005) found that those mothers who did not have a physical mother-infant contact during the first 24 hours after the birth of the infant had a higher level of stress and fears about their infant being at risk of dying. A parallel finding was also reported by Flacking and colleagues (2006); the mothers described that the ability to hold the infant

was a sign of the infant's vitality and strength indicating that the infant would survive.

The mother-infant contact and touch following the birth of the full-term infants has been found to increase the release of oxytocin (Matthiesen et al. 2001) which has been found to decrease maternal anxiety, to increase the mother's social responsiveness and to enhance parenting behaviours (Feldman et al. 2007, Levine et al. 2007, Jonas et al. 2008). In this study the length of the early physical contact was much shorter than in studies among full-term mothers. Therefore, it is possible but not proven that the brief physical mother-infant contact was enough to release an adequate amount of oxytocin to enhance the development of maternal attachment during the postpartum period. An interesting finding of this study was that the lack of even a brief physical mother-infant contact was associated with more emotional and behavioural symptoms in preterm children at five to six years of age (III).

This finding emphasise the importance of early physical mother-infant contact before admission of the preterm infant to the NICU. It is not always possible to organise even a brief physical mother-infant contact among preterm infants because of the initial resuscitation of the critically ill infant, but the importance of the early physical contact should be recognised, and whenever physical it is safely possible, it should be facilitated. The lack of early physical contact and mother-infant separation due to hospitalisation can be compensated with Kangaroo mother care during the hospital period of the infant, which has been proved to be beneficial in both mother and infant (Tessier et al. 1998, Feldman et al. 2002, Tessier et al. 2003). Mothers' physical contact with her infant during neonatal intensive care has been shown to improve the quality of mother-infant interaction (Feldman et al. 2003, Ferber et al. 2005), so if it is not possible to allow early physical contact between mother and infant in the delivery room, it is nevertheless important to motivate parents to have physical contact with their infant as soon as possible in the neonatal intensive care unit.

Mother's recollection of the birth and behavioural and emotional symptoms of the preterm child

In this study mother's negative recollections of the birth and the first encounter with the preterm infant were associated with concurrent behavioural and emotional symptoms among preterm children at five to six years of age (III). No such associations were found among full-term children and their mothers.

The effects of mother's negative experiences of the birth and first encounter with the infant on the child's later behavioural and emotional symptoms may be mediated through mother-infant interaction. The mother's severe negative or traumatic experiences of the delivery have been associated with an increased risk for mother's postnatal psychological distress (Skari et al. 2002, Davies et al.

2008), which has been shown to have an effect on mother-infant interaction both among full-term (Murray et al. 1996) and preterm infants (Wijnroks 1999, Muller-Nix et al. 2004, Korja et al. 2008b). Negative experiences of birth of the infant may also increase the mother's risk for postnatal depression, which increases the risk for difficulties in mother-infant interaction (Hiltunen 2003, Korja et al. 2008b) and adverse outcome of the child (Grace et al. 2003). In addition, the mother's negative experiences during the delivery may increase the risk for difficulties in maternal attachment. The difficulties in early mother-infant interaction have been shown to be an important factor in the socio-emotional development of the child (Murray et al. 1999, Gerhold et al. 2002). In addition one factor is that the vulnerability of preterm infants may also predispose these infants to subtle changes in interaction behaviour (Landry et al. 2001, Laucht et al. 2001). The long-lasting negative recollections of the birth experiences and their effects on the children's emotional and behaviour symptoms in the preterm group might also reflect the overall vulnerability of the preterm children and their mothers.

The evaluation of the mother's experiences retrospectively provides the advantage of getting a more enduring view of the mother's experiences of the birth of the infant, which may in long-term be more relevant concerning the parenting of the preterm child. The mother constructs the narrative about her experience of the preterm birth of the infant and she may not recall all the facts accurately, but the recollection of the situation is, however, a narrative in which she believes. This recollection may have more influence on parenting the preterm child than what actually happened during the delivery (Stern 1998).

Preterm child's ability to address separation situations and child's representations of parents

The child's experiences of parenting and separations situations were evaluated by using play narratives. Play narratives provide a suitable way to understand a young child's experiences, feelings and thoughts (Emde 2003). In play narratives children resolve different situations using their previous experiences in everyday situations. Play narratives also reveal the child's capacity to use his/her experiences creatively in different situations.

Mother's feeling that the "baby does not belong to her" during the infant's hospital period was associated with fewer caring representations of parents in the child's play narratives when the child was five to six years of age (IV). This maternal experience, even when extracted from a single question as in the CLIP, may reflect difficulties in the very early phase of maternal attachment or it may be a sign of impaired bonding as suggested by Brockington and colleagues (2006a). The effect of mother's attachment difficulties on child's caring representations can be mediated through mother's behaviour or mothers'

emotional state in everyday situations. This was supported in a study by Oppenheim and colleagues (1997); mother's psychological distress was associated with fewer positive maternal representations in children's play narratives at 4 and 5 years. Mother's attachment difficulties may increase the risk for difficulties in the development of child's attachment relationship. Fewer caring representations in children's play narratives might indicate difficulties in the mother-child relationship as the child's secure attachment has been associated with positive parental representations (Cassidy 1988, Bretherton et al. 1990). The association between maternal attachment difficulties and child's parental representations was also supported by a study by Steele and colleagues (2003); the mother's insecure attachment pattern during pregnancy was associated with fewer parental representations like limit-setting and providing guidance in children's play narratives five years later. On another level of interpretation mother's care-giving representations can be thought to be affected by her attachment difficulty which, in turn, affects mothers' impaired reflective function and mentalisation capacity and, consequently, her behaviour (Fonagy et al. 2004). This interpretation is supported by Scher and colleagues (2006), whose study showed an association between the mothers parenting representations of their own sensitive parenting style and children's positive representations in play narratives when the children were six years of age, whereas the quality of mother-infant interaction showed no association.

Those preterm children who had experienced longer early mother-infant separation due to hospitalisation had more difficulties addressing the separation situations in play narratives at five to six years of age (IV). Perhaps the mother-infant separation at the beginning of the infant's life can lead to a situation in which subsequent everyday separation situations are more difficult for the children and the mothers. Therefore, both parties should have a say. If we concentrate solely on mother's experiences we will miss the child's own experiences and the chance to understand child's difficulties in separation situations and, consequently, the possibility to help the child to handle the separation difficulties, for example, through play sessions.

Conclusions

There are several conclusions to be drawn from the study:

The visiting frequency of mothers in the NICU has slightly increased between 1989 and 1997-98, but no such trend was seen among fathers. Family-related factors affected the visiting frequency of both parents. A new factor affecting maternal visits was lower gestational age of the infant. The preterm birth disrupts the normal process of transition to motherhood, suggesting that psychological factors also affect the visiting frequency of the mothers.

Mothers of preterm infants had more negative recollections of the birth of the infant still five to six years after the infant's birth. Lower gestational age of the infant was associated with the mother's more negative recollections of the birth and of the first encounter with the newborn infant. Importantly, the lack of early physical mother-infant contact before the infant's admission to the NICU was associated with the mother's feeling that "the baby doesn't belong to her" indicating the difficulties in the development of maternal attachment.

Mother's negative recollections about the birth and the first encounter with the infant, and the lack of early physical mother-infant contact were associated with behavioural and emotional symptoms of the preterm child at five to six years of age. In addition, mother's visiting less than every day to the NICU was associated with a risk for later behavioural and emotional symptoms of the child.

Examining child's own experiences showed that the length of early mother-infant separation due to hospitalisation was associated with the child's ability to address the separation situations in the play narratives. Mother's feeling that baby does not belong to her during the infant's hospitalisation in the NICU seemed to have long-term effects on the development of child's representations of the parents.

Implications for clinical practice and future research

Neonatal intensive care has improved in recent decades and more preterm infants survive without major disabilities. However, there is still an increased risk for behavioural and emotional symptoms among preterm children. This increased risk has been explained by biological risk factors related to prematurity, but the early separation and psychological distress of the parents has also been shown to be important.

Almost half of the mothers of preterm infants had negative or traumatic recollections of the birth of the infant, which was associated with concurrent behavioural and emotional symptoms of the children. This finding emphasises the importance of maternal experiences during the delivery and the importance of identifying the mothers with negative or traumatic delivery experiences already during the infant's hospital period. The mothers who have traumatic experiences need closer support and sometimes also psychiatric evaluation. Those mothers who have also had previous traumatic experiences or mental illness are especially vulnerable. For some mothers discussing of their delivery experiences during the infant's hospitalisation may be too difficult, so it is important to return to the subject after the discharge of the infant during visits to the well-baby clinic or visits in the paediatric out patient clinic. It might also be possible to prevent some of the negative experiences by ensuring consistency of care and adequate information.

In light of this study, the CLIP interview seems to be a good tool to identify mothers needing support as it provides extensive information about mothers' subjective experience of pregnancy and the birth of the infant, thereby identifying a risk group for later problems. However, the CLIP interview may not be feasible in the pressing atmosphere of the neonatal intensive care unit because of it being too complicated and time-consuming. In the NICU it is possible to identify the mothers who need more support and follow up by simply asking mother about her experiences of the birth of infant and asking about her maternal feelings toward her infant and observing her visiting activity.

Maternal visiting frequency provides a simple and inexpensive indicator of a group of children that may be at increased risk for subsequent behavioural and emotional problems. If a mother visits her infant infrequently, it is important discuss with the mother the reasons preventing her from visiting the NICU. In

future research, to encourage active participation of the family in the neonatal intensive care unit, we need more information about the factors influencing the visits and interventions to support parental visiting. It is especially important to study the effects of mother's psychological distress, traumatic experiences and difficulties in maternal attachment on mother's participation in the care of her infant during the hospital period. To enable the parent's participation to the care of their preterm infant it is important to organise the facilities of neonatal units so that they support parents' active participation.

Early mother-infant separation due to hospitalisation complicates the development of close mother-infant contact and seems to have long-term effects on the socio-emotional development of the preterm child. The family rooms in the NICU give parents an opportunity to be with their preterm infant and participate in the care of the infant as much as possible. If this is not possible, it is important to support the close mother-infant contact during the hospitalisation in every possible way, e.g. by emphasising to the mother the importance of close contact with the infant and by encouraging the use of Kangaroo mother care, to minimise the effects of mother-infant separation. It is also important to minimise the length of the hospitalisation by optimising the care of the preterm infant.

The findings of this dissertation also emphasise the importance of early mother-infant physical contact prior to admission to the NICU. Although an early physical contact is not always possible because of the initial resuscitation of a critically ill preterm infant, the importance of this should be recognised, and whenever even a brief early physical contact between mother and infant is possible, it should be facilitated. If it is not possible to arrange early physical mother-infant contact, it is nevertheless important to motivate the mother and the father to have physical contact with their infant as soon as it is possible. In future research, it is important to examine the early physical mother-infant contact and the factors affecting it as well as the effect of physical contact on maternal feelings and attachment towards the preterm infant.

The evaluation of the young child's own experiences by conventional interview methods is not feasible, because of the young child's limited capacity to relate his/her experiences accurately. In light of this and previous studies the MSSB play narratives provide a more suitable way to understand a young child's internal world and his/her feelings and thoughts. In the clinical context it is important to elicit information from the child about his/her experiences so that we do not need to rely solely on parental reports of the child's experience. In the future it will be important to develop the use of play narrative in child's clinical assessment and compile more information on what kind of responses in play narrative are associated with the child's psychopathology or the risk of impaired socio-emotional development.

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Appendices

1. The background information questionnaire
2. The Child Behavior Checklist, the version for 4 to 6-year-old children.
3. The Child Behavior Checklist, the version for 7 to 18-year-old children
4. The Edinburgh Postnatal Depression Scale
5. The questionnaire on Separation Experiences for preterm children
6. The questionnaire on Separation Experiences for full-term children

Appendix 1. The background information questionnaire

Tutkimukseen osallistuvan lapsen nimi _____

Lomakkeen täyttöpäivä _____

Lomakkeen täyttäjä _____

YLEISTIEDOT LAPSESTA JA PERHEESTÄ

Pyydämme Teitä vastaamaan seuraaviin kysymyksiin kirjoittamalla vastauksen sille varatulle riville tai ympäröimällä sopivan vastauksen numeron.

1. Montako lasta perheessänne asuu? _____

2. Lasten sukupuoli ja syntymäaika (tyttö = T, poika = P. Esim. T – 80, P – 82 jne.) _____

3. Lapsen hoidosta vastaavat vanhemmat ovat

- | | | |
|--|----------------|---------------|
| 1 lapsen biologiset vanhemmat | | |
| 2 biologinen äiti ja kasvatusisä (äidin uusi avo- tai aviopuoliso) | vuodesta _____ | lähtien _____ |
| 3 biologinen äiti yksin | vuodesta _____ | lähtien _____ |
| 4 biologinen isä ja kasvatusäiti (isän uusi avo- tai aviopuoliso) | vuodesta _____ | lähtien _____ |
| 5 biologinen isä yksin | vuodesta _____ | lähtien _____ |
| 6 adoptiovanhemmat | vuodesta _____ | lähtien _____ |
| 7 sijaisvanhemmat | vuodesta _____ | lähtien _____ |
| 8 muu, kuka? _____ | vuodesta _____ | lähtien _____ |

4. Jos lapsen vanhemmat ovat eronneet, vanhempien avioerovuosi _____

5. Äidin tai äidin asemassa olevan:

syntymävuosi _____

ammatti _____

koulutus _____

a) peruskoulutus

1 keskeytynyt kansa-, perus- tai keskikoulu

2 kansakoulu

3 perus- tai keskikoulu

4 ylioppilas

b) ammatillinen koulutus

1 ei ammattikoulutusta

2 ammattikurssi/kursseja

3 ammattikoulu, kauppakoulu tai muu kouluasteen oppilaitos

4 opisto- tai ammattikorkeakouluasteen koulutus

5 yliopistoasteen koulutus

6 muu, mikä? _____

Isän tai isän asemassa olevan:

syntymävuosi _____

ammatti _____

koulutus _____

a) peruskoulutus

1 keskeytynyt kansa-, perus- tai keskikoulu

2 kansakoulu

3 perus- tai keskikoulu

4 ylioppilas

b) ammatillinen koulutus

1 ei ammattikoulutusta

2 ammattikurssi/kursseja

3 ammattikoulu, kauppakoulu tai muu kouluasteen oppilaitos

4 opisto- tai ammattikorkeakouluasteen koulutus

5 yliopistoasteen koulutus

6 muu, mikä? _____

6. Onko tutkimukseen osallistuvan lapsen kehityksessä todettu jotain erityistä mainittavaa? _____

KIITÄMME AVUSTANNE!

Appendix 2. The Child Behavior Checklist, the version for 4 to 6-year-old children.

| KYSELY VANHEMMILLE 4-6-vuotiaista (alle kouluikäisille) | | | | Luottamuksellinen | |
|--|-------------|---|---|------------------------------|--|
| Lapsen nimi: | | | Vanhempien työ ja ammatti (Mahdollisimman tarkasti - esim. automekaanikko, yläasteen opettaja, sairaanhoitaja, kotirouva, merkonomi, myyjä, myös vaikka vanhemmat eivät olisi juuri nyt työssä): | | |
| Sukupuoli: <input type="checkbox"/> Poika <input type="checkbox"/> Tyttö | Ikä: | Äidinkieli: <input type="checkbox"/> Suomi <input type="checkbox"/> Ruotsi <input type="checkbox"/> Muu, mikä? | Isä: _____ Äiti: _____ | | |
| Päiväys: pv kk v | | Lapsen sosiaalityö: pv kk v tunnus | Lomakkeen täyttäjät: <input type="checkbox"/> Äiti <input type="checkbox"/> Isä <input type="checkbox"/> Muu, kuka? _____ | | |
| Käykö lapsi koulua? <input type="checkbox"/> Ei <input type="checkbox"/> Kyllä Onko lapsi esikoulussa? <input type="checkbox"/> Ei <input type="checkbox"/> Kyllä | | | | | |
| Ole ystävällinen ja vastaa tämän lomakkeen kysymyksiin laittamalla rasti siihen kohtaan, joka parhaiten kuvaa, miten <i>Sinä itse</i> koet ja näet lapsen, vaikka muut saattavat olla toista mieltä. Voit lisäksi kirjoittaa omia kommenttejasi. | | | | | |
| I. Luettelisitko urheilulajeja, joita lapsesi mieluiten harrastaa (esim. uiminen, jääkiekko, voimistelu, jalkapallo jne): <input type="checkbox"/> Ei mitään urheilulajeja | | | Kuinka paljon aikaa lapsi käyttää lajiin muihin samanikäisiin verrattuna? | | Kuinka hyvä hän on lajissa muihin samanikäisiin verrattuna? |
| | | | En tiedä | Keskimääräistä vähemmän | Keskimääräisesti |
| | | | En tiedä | Keskimääräistä vähemmän | Keskimääräisesti |
| | | | En tiedä | Keskimääräistä vähemmän | Keskimääräisesti |
| a. | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| II. Luettelisitko lapsesi muita lempiharrastuksia, tekemisiä ja leikkejä (esim. lukeminen, pelit, musiikki, käsityöt, postimerkkeily jne. - tv:tä ei lasketa): <input type="checkbox"/> Ei tällaisia harrastuksia | | | Kuinka paljon aikaa lapsi käyttää siihen muihin samanikäisiin verrattuna? | | Kuinka hyvä hän on siinä muihin samanikäisiin verrattuna? |
| | | | En tiedä | Keskimääräistä vähemmän | Keskimääräisesti |
| | | | En tiedä | Keskimääräistä vähemmän | Keskimääräisesti |
| a. | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| III. Luettelisitko mihin joukkueisiin, kerhoihin, yhdistyksiin tai ryhmiin lapsi kuuluu (esim. urheiluseura/joukkue, harrastuskerho, kuoro jne): <input type="checkbox"/> Ei mihinkään | | | Kuinka aktiivinen hän on niissä muihin samanikäisiin verrattuna? | | |
| | | | En tiedä | Ei yhtä aktiivinen kuin muut | Yhtä aktiivinen kuin muut |
| | | | En tiedä | Ei yhtä aktiivinen kuin muut | Yhtä aktiivinen kuin muut |
| a. | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | | | | | |
|---|--|---|--------------------------|--------------------------|--------------------------|
| IV. Luettelisitko mitä töitä ja tehtäviä lapsella on (esim. oman huoneen siivous, muut kotityöt, mainosten jakaminen, lastenhoito jne): | | Kuinka hyvin hän itsenäisesti suoriutuu tehtäviään muihin samanikäisiin verrattuna? | | | |
| <input type="checkbox"/> Ei mitään | | En tiedä | Keskitasoa huonommin | Keskitasoisesti | Keskitasoa paremmin |
| a. | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

V.1. Kuinka monta läheistä ystävää lapsella on? (Sisaruksia ei lasketa mukaan) ☐ Ei yhtään ☐ 1 ☐ 2 tai 3 ☐ 4 tai enemmän

2. Kuinka monta kertaa viikossa lapsi tapaa ystäviään? ☐ Vähemmän kuin kerran ☐ 1 tai 2 ☐ 3 tai useammin

VI. Verrattuna muihin samanikäisiin kuinka hyvin lapsesi:

| | Huonommin | Keskitasoisesti | Paremmiin | |
|---------------------------------------|--------------------------|--------------------------|--------------------------|--|
| a. Tulee toimeen sisarustensa kanssa | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Ei ole sisaruksia |
| b. Tulee toimeen muiden lasten kanssa | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| c. Tulee toimeen vanhempiensa kanssa | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| d. Leikkii tai työskentelee omin päin | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |

VII. Lapsen taidot:

Kuinka lapsi on kehittynyt seuraavissa asioissa verrattuna muihin samanikäisiin:

| | Ala-arvoisesti | Keskitasoa huonommin | Keskitasoisesti | Keskitasoa paremmin |
|--------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| a. Puhe | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Annettujen ohjeiden noudattaminen | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Omien toiveidensa ilmaiseminen | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Omista kokemuksista kertominen | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Kiintymyksen osoittaminen | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Pettymyksen ilmaiseminen | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Onko lapsellasi joku sairaus, ruumillinen vamma tai mielenterveysongelma?

☐ Ei ☐ Kyllä - kertoisitko tarkemmin:

Mikä huolestuttaa Sinua eniten lapsessasi?

Kuvailisitko lapsesi parhaita puolia:

Seuraavassa on joukko lapsilla joskus esiintyviä ominaisuuksia ja ongelmia. Arvioi miten mikin väittämä sopii lapseesi, kun ajattelet tätä hetkeä ja viimeksi kulunutta puolta vuotta. Ympyröi sopivin vaihtoehto. Ole ystävällinen ja vastaa kaikkiin kysymyksiin, myös vaikka joku väittämä ei oikein sovi tälle lapselle.

| 0 = Ei sovi lainkaan | 1 = Sopii jossain määrin tai toisinaan | 2 = Sopii erittäin hyvin tai usein |
|--|--|------------------------------------|
| 0 1 2 1. Lapsi käyttäytyy ikäistään nuoremalla tavalla | 0 1 2 36. Satuttaa itsensä usein, on tapaturma-altis | |
| 0 1 2 2. On allerginen. (Kuvaile): | 0 1 2 37. Joutuu usein tappeluun | |
| | 0 1 2 38. Joutuu usein kiusatuksi | |
| 0 1 2 3. Väittää usein vastaan | 0 1 2 39. Liikkuu sellaisten kavereiden kanssa, jotka joutuvat usein vaikeuksiin | |
| 0 1 2 4. Lapsella on astma | 0 1 2 40. Kuulee ääniä, joita ei ole olemassa. (Kuvaile): | |
| 0 1 2 5. Käyttäytyy vastakkaisen sukupuolen tavoin | | |
| 0 1 2 6. Ulostaa muualle kuin vessaan, esim. housuihin | 0 1 2 41. Toimii hetken mieltäjohteesta tai ajattelematta | |
| 0 1 2 7. Kerskailee, leuhkii, mahtaillee | 0 1 2 42. On mieluummin yksin kuin muiden kanssa | |
| 0 1 2 8. Ei pysty keskittymään tai olemaan tarkkaavainen pitkää aikaa | 0 1 2 43. Valehtelee tai petkuttaa | |
| 0 1 2 9. Ei saa pois mielestään tiettyjä ajatuksia. (Kuvaile): | 0 1 2 44. Pureskelee kynsiään | |
| | 0 1 2 45. Lapsi on hermostunut, kireä tai jännittynyt | |
| 0 1 2 10. On levoton, ei pysty istumaan hiljaa | 0 1 2 46. Hermostuneita liikkeitä tai nykimistä. (Kuvaile): | |
| 0 1 2 11. On liian riippuvainen, takertuu aikuisiin | | |
| 0 1 2 12. Valittaa yksinäisyyttä | 0 1 2 47. Näkee painajaisia | |
| 0 1 2 13. On hämmentynyt ja ymmällään | 0 1 2 48. Muut lapset eivät pidä hänestä | |
| 0 1 2 14. Itkee paljon | 0 1 2 49. Hänellä on ummetusta | |
| 0 1 2 15. On julma eläimille | 0 1 2 50. On liian pelokas tai ahdistunut | |
| 0 1 2 16. On julma tai ilkeä, kiusaa muita | 0 1 2 51. Tuntee huimausta | |
| 0 1 2 17. Unelmoi tai vaipuu ajatuksiinsa | 0 1 2 52. Tuntee liikaa syyllisyyttä | |
| 0 1 2 18. Vahingoittaa itseään tahallisesti tai yrittää itsemurhaa | 0 1 2 53. Syö liikaa | |
| 0 1 2 19. Vaatii paljon huomiota | 0 1 2 54. On liian väsynyt | |
| 0 1 2 20. Rikkoo tai tuhoaa omia tavaroitaan | 0 1 2 55. On ylipainoinen. Paino: _____ kg. Pituus: _____ cm. | |
| 0 1 2 21. Rikkoo perheelleen tai muille kuuluvia tavaroita | 56. On ruumiillisia vaivoja ilman todettua lääketieteellistä syytä: | |
| 0 1 2 22. On tottelematon kotona | 0 1 2 a. Särkyjä tai kipuja (ei päänsärky) | |
| 0 1 2 23. On tottelematon päiväkodissa tai päivähoidossa | 0 1 2 b. Päänsärky | |
| 0 1 2 24. Syö huonosti | 0 1 2 c. Pahoinvointia, sairaalloinen. | |
| 0 1 2 25. Ei tule toimeen muiden lasten kanssa | 0 1 2 d. Silmävaivoja (Kuvaile): | |
| 0 1 2 26. Ei näytä tuntevan syyllisyyttä käyttäytyttyään huonosti | | |
| 0 1 2 27. On helposti kateellinen | 0 1 2 e. Ihottumaa tai muita iho-ongelmia | |
| 0 1 2 28. Syö tai juo muuta kuin ruoka-aineita - ei tarkoita makeisia. (Kuvaile): | 0 1 2 f. Vatsakipu | |
| | 0 1 2 g. Oksentelua | |
| 0 1 2 29. Pelkää tiettyjä eläimiä, tilanteita tai paikkoja - muuta kuin koulua. (Kuvaile): | 0 1 2 h. Muuta (Kuvaile): | |
| | | |
| 0 1 2 30. Pelkää päiväkotia tai päivähoitoon menoa | 0 1 2 57. Hyökkää toisten kimppuun, esim. lyö toisia | |
| 0 1 2 31. Pelkää ajattelevansa tai tekevänsä jotain pahaa. (Kuvaile): | 0 1 2 58. Nyppii ihoaan, nensänsä tai muita ruumiinosiaan. (Kuvaile): | |
| | | |
| 0 1 2 32. Tuntee, että hänen on oltava täydellinen | 0 1 2 59. Leikkii sukupuolielimillään julkisesti | |
| 0 1 2 33. Tuntee tai valittaa, että kukaan ei rakasta häntä | 0 1 2 60. Leikkii sukupuolielimillään liian paljon | |
| 0 1 2 34. Tuntee toisten uhkaavan tai vainoavan itseään | 0 1 2 61. Selviytyy huonosti koulutyöstä | |
| 0 1 2 35. Tuntee olevansa arvoton tai huonompi kuin muut | 0 1 2 62. On kömpelö, liikkeiden koordinaatio on huono | |

0 = Ei sovi lainkaan

1 = Sopii jossain määrin tai toisinaan

2 = Sopii erittäin hyvin tai usein

| | |
|---|--|
| 0 1 2 63. On mieluiten itseään vanhempien lasten kanssa | 0 1 2 97. Uhkailee muita ihmisiä |
| 0 1 2 64. On mieluiten itseään nuorempien lasten kanssa | 0 1 2 98. Imee peukalooan |
| 0 1 2 65. Kieltäytyy puhumasta | 0 1 2 99. On liian huolissaan järjestyksestä tai siisteydestä |
| 0 1 2 66. Toistaa tiettyjä toimintoja uudelleen ja uudelleen, on pak- kotoimintoja. (Kuvaile): | 0 1 2 100. Nukkumisongelmia. (Kuvaile): |
| 0 1 2 67. Karkaa kotoa | 0 1 2 101. Viihtyy huonosti päiväkodissa tai päivähoitossa |
| 0 1 2 68. Huutaa paljon | 0 1 2 102. On vetämätön, hidasliikkeinen ja voimaton |
| 0 1 2 69. Vaitelias, pitää asiat itsellään | 0 1 2 103. On onneton, surullinen tai masentunut |
| 0 1 2 70. Näkee asioita, joita ei ole. (Kuvaile): | 0 1 2 104. On epätavallisen äänekäs |
| 0 1 2 71. On vaivautunut, menee helposti hämilleen | 0 1 2 105. Syö liikaa lohduttaakseen itseään |
| 0 1 2 72. Sytyttelee tulipaloja | 0 1 2 106. Tuhoaa ja rikkoo paljon |
| 0 1 2 73. Seksuaalisuuteen liittyviä ongelmia. (Kuvaile): | 0 1 2 107. Päiväkastelua |
| 0 1 2 74. Yrittää tehdä vaikutuksen tai pelleilee | 0 1 2 108. Yökastelua |
| 0 1 2 75. On ujo | 0 1 2 109. Marisee ja kitisee |
| 0 1 2 76. Nukkuu vähemmän kuin useimmat lapset | 0 1 2 110. Toivoisi olevansa vastakkaista sukupuolta |
| 0 1 2 77. Nukkuu päivällä ja/tai yöllä enemmän kuin useimmat lapset. (Kuvaile): | 0 1 2 111. On vetäytyvä, ei liity muiden seuraan |
| 0 1 2 78. Sotkee tai leikkii ulosteella | 0 1 2 112. On huolestunut |
| 0 1 2 79. Puhevaikeuksia. (Kuvaile): | 0 1 2 113. Jos lapsellasi on muita kuin edellä lueteltuja ongelmia, kirjoittaisitko ne tähän: |
| 0 1 2 80. Tuijottaa ilmeettömästi | |
| 0 1 2 81. Varastaa kotoa | |
| 0 1 2 82. Varastaa kodin ulkopuolelta | |
| 0 1 2 83. Kerää tavaroita, joita ei tarvitse. (Kuvaile): | |
| 0 1 2 84. Outoa käyttäytymistä. (Kuvaile): | |
| 0 1 2 85. Outoja ajatuksia. (Kuvaile): | |
| 0 1 2 86. On itsepäinen, juro tai ärtyisä | |
| 0 1 2 87. Mielialat tai tunteet vaihtelevat äkillisesti | |
| 0 1 2 88. Murjottaa paljon | |
| 0 1 2 89. On epäluuloinen | |
| 0 1 2 90. Kiroilee tai käyttää rivoa kieltä | |
| 0 1 2 91. Puhuu itsensä tappamisesta | |
| 0 1 2 92. Puhuu tai kävelee unissaan. (Kuvaile): | |
| 0 1 2 93. Puhuu liian paljon | |
| 0 1 2 94. Kiusaa paljon muita | |
| 0 1 2 95. Saa raivokohtauksia tai on kiivasluontoinen | |
| 0 1 2 96. Ajattelee liikaa seksiasioita | |

Ole ystävällinen ja tarkista, että olet vastannut kaikkiin kysymyksiin.
 Alleiviivaa niitä kohtia, joista olet huolissasi, jos sellaisia on!
KIITOS VASTAUKSISTA!
 Mikäli vielä haluat kertoa jotain lapsestasi, voit käyttää alla olevaa tilaa siihen.

Appendix 3. The Child Behavior Checklist, the version for 7 to 18-year-old children

| KYSELY VANHEMMILLE 7-18-vuotiaista koululaisista | | | | Luottamuksellinen | |
|--|---|--|---|--|--------------------------|
| Lapsen nimi: | | | | Vanhempien työ ja ammatti (Mahdollisimman tarkasti - esim. automekaanikko, yläasteen opettaja, sairaanhoitaja, kotirouva, merkonomi, myyjä, myös vaikka vanhemmat eivät olisi juuri nyt työssä): | |
| Sukupuoli: <input type="checkbox"/> Poika <input type="checkbox"/> Tyttö | Ikä: | Äidinkieli: <input type="checkbox"/> Suomi <input type="checkbox"/> Ruotsi <input type="checkbox"/> Muu, mikä? | Isä: _____ Äiti: _____ | | |
| Päiväys: pv kk v | Lapsen sosiaaliturvatunnus: pv kk v tunnus | | Lomakkeen täyttäjä: <input type="checkbox"/> Äiti <input type="checkbox"/> Isä <input type="checkbox"/> Muu, kuka? _____ | | |
| Käykö lapsi koulua? <input type="checkbox"/> Ei <input type="checkbox"/> Kyllä, mikä luokka? | | | | | |
| Ole ystävällinen ja vastaa tämän lomakkeen kysymyksiin laittamalla rasti siihen kohtaan, joka parhaiten kuvaa, miten <i>Sinä itse</i> koet ja näet lapsen, vaikka muut saattavat olla toista mieltä. Voit lisäksi kirjoittaa omia kommenttejasi. | | | | | |
| I. Luettelisitko urheilulajeja, joita lapsesi mieluiten harrastaa (esim. uiminen, jääkiekko, voimistelu, jalkapallo jne): <input type="checkbox"/> Ei mitään urheilulajeja | | Kuinka paljon aikaa lapsi käyttää lajiin muihin samanikäisiin verrattuna? | | Kuinka hyvä hän on lajissa muihin samanikäisiin verrattuna? | |
| | | En tiedä | Keskimääräistä vähemmän | Keskimääräisesti | Keskimääräistä enemmän |
| a. _____ | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. _____ | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. _____ | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| II. Luettelisitko lapsesi muita lempiharrastuksia, tekemisiä ja leikkejä (esim. lukeminen, pelit, musiikki, käsityöt, postimerkkikelly jne. - tv:tä ei lasketa): <input type="checkbox"/> Ei tällaisia harrastuksia | | Kuinka paljon aikaa lapsi käyttää siihen muihin samanikäisiin verrattuna? | | Kuinka hyvä hän on siinä muihin samanikäisiin verrattuna? | |
| | | En tiedä | Keskimääräistä vähemmän | Keskimääräisesti | Keskimääräistä enemmän |
| a. _____ | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. _____ | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. _____ | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| III. Luettelisitko mihin joukkueisiin, kerhoihin, yhdistyksiin tai ryhmiin lapsi kuuluu (esim. urheiluseura/joukkue, harrastuskerho, kuoro jne): <input type="checkbox"/> Ei mihinkään | | Kuinka aktiivinen hän on niissä muihin samanikäisiin verrattuna? | | | |
| | | En tiedä | Ei yhtä aktiivinen kuin muut | Yhtä aktiivinen kuin muut | Aktiivisempi kuin muut |
| a. _____ | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. _____ | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. _____ | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | | | | | |
|---|--|---|--------------------------|--------------------------|--------------------------|
| IV. Luettelisitko mitä töitä ja tehtäviä lapsella on (esim. oman huoneen siivous, muut kotityöt, mainosten jakaminen, lastenhoito jne): | | Kuinka hyvin hän itsenäisesti suoriutuu tehtäviään muihin samanikäisiin verrattuna? | | | |
| <input type="checkbox"/> Ei mitään | | En tiedä | Keskitasoa huonommin | Keskitasoisesti | Keskitasoa paremmin |
| a. | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

V.1. Kuinka monta läheistä ystävää lapsella on? ☐ Ei yhtään ☐ 1 ☐ 2 tai 3 ☐ 4 tai enemmän
(Sisaruksia ei lasketa mukaan)

2. Kuinka monta kertaa viikossa lapsi tapaa ystäviään koulun ulkopuolella? ☐ Vähemmän kuin kerran ☐ 1 tai 2 ☐ 3 tai useammin

VI. Verrattuna muihin samanikäisiin kuinka hyvin lapsesi:

| | Huonommin | Keskitasoisesti | Paremmiin | |
|---------------------------------------|--------------------------|--------------------------|--------------------------|--|
| a. Tulee toimeen sisarustensa kanssa | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Ei ole sisaruksia |
| b. Tulee toimeen muiden lasten kanssa | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| c. Tulee toimeen vanhempiensa kanssa | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| d. Leikkii tai työskentelee omin päin | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |

VII. Lapsen koulumenestys

Kuinka lapsi menestyy seuraavissa aineissa verrattuna muihin samanikäisiin:

| | Ala-arvoisesti | Keskitasoa huonommin | Keskitasoisesti | Keskitasoa paremmin |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> Ei käy koulua, miksi? | | | | |
| a. Äidinkieli | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Ympäristöoppi, uskonto, historia | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Matemaattiset aineet | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Biologia, fysiikka, kemia | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <u>Muut aineet:</u> | | | | |
| e. _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f. _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| g. _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. Käykö lapsi erityisluokkaa tai -koulua? ☐ Ei ☐ Kyllä, minkälaista?

3. Onko lapsi käynyt jonkun luokan kahteen kertaan? ☐ Ei ☐ Kyllä, minkä?

4. Onko lapsella ollut vaikeuksia jossain kouluaineessa tai muita kouluvaikeuksia?

☐ Ei ☐ Kyllä, minkälaisia? Milloin nämä vaikeudet alkoivat?

Ovatko nämä ongelmat loppuneet? ☐ Ei ☐ Kyllä, milloin?

Onko lapsellasi joku sairaus, ruumillinen vamma tai mielenterveysongelma?

☐ Ei ☐ Kyllä - kertoisitko tarkemmin:

Mikä huolestuttaa Sinua eniten lapsessasi?

Kuvailisitko lapsesi parhaita puolia:

Seuraavassa on joukko lapsilla joskus esiintyviä ominaisuuksia ja ongelmia. Arvioi miten mikin väittäjä sopii lapseesi, kun ajattelet tätä hetkeä ja viimeksi kulunutta puolta vuotta. Ympyröi sopivin vaihtoehto. Ole ystävällinen ja vastaa kaikkiin kysymyksiin, myös vaikka joku väittäjä ei oikein sovi tälle lapselle.

| 0 = Ei sovi lainkaan | 1 = Sopii jossain määrin tai toisinaan | 2 = Sopii erittäin hyvin tai usein |
|--|--|------------------------------------|
| 0 1 2 1. Lapsi käyttäytyy ikäistään nuoremmalla tavalla | 0 1 2 36. Satuttaa itsensä usein, on tapaturma-altis | |
| 0 1 2 2. On allerginen. (Kuvaile): | 0 1 2 37. Joutuu usein tappeluun | |
| 0 1 2 3. Väittää usein vastaan | 0 1 2 38. Joutuu usein kiusatuksi | |
| 0 1 2 4. Lapsella on astma | 0 1 2 39. Liikkuu sellaisten kavereiden kanssa, jotka joutuvat usein vaikeuksiin | |
| 0 1 2 5. Käyttäytyy vastakkaisen sukupuolen tavoin | 0 1 2 40. Kuulee ääniä, joita ei ole olemassa. (Kuvaile): | |
| 0 1 2 6. Ulostaa muualle kuin vessaan, esim. housuihin | 0 1 2 41. Toimii hetken mielijohteesta tai ajattelematta | |
| 0 1 2 7. Kerskailee, leuhkii, mahtaillee | 0 1 2 42. On mieluummin yksin kuin muiden kanssa | |
| 0 1 2 8. Ei pysty keskittymään tai olemaan tarkkaavainen pitkää aikaa | 0 1 2 43. Valehtelee tai petkuttaa | |
| 0 1 2 9. Ei saa pois mielestään tiettyjä ajatuksia. (Kuvaile): | 0 1 2 44. Pureskelee kynsiään | |
| 0 1 2 10. On levoton, ei pysty istumaan hiljaa | 0 1 2 45. Lapsi on hermostunut, kireä tai jännittynyt | |
| 0 1 2 11. On liian riippuvainen, takertuu aikuisiin | 0 1 2 46. Hermostuneita liikkeitä tai nykimistä. (Kuvaile): | |
| 0 1 2 12. Valittaa yksinäisyyttä | 0 1 2 47. Näkee painajaisia | |
| 0 1 2 13. On hämmentynyt ja ymmällään | 0 1 2 48. Muut lapset eivät pidä hänestä | |
| 0 1 2 14. Itkee paljon | 0 1 2 49. Hänellä on ummetusta | |
| 0 1 2 15. On julma eläimille | 0 1 2 50. On liian pelokas tai ahdistunut | |
| 0 1 2 16. On julma tai ilkeä, kiusaa muita | 0 1 2 51. Tuntee huimausta | |
| 0 1 2 17. Unelmoi tai vaipuu ajatuksiinsa | 0 1 2 52. Tuntee liikaa syyllisyyttä | |
| 0 1 2 18. Vahingoittaa itseään tahallisesti tai yrittää itsemurhaa | 0 1 2 53. Syö liikaa | |
| 0 1 2 19. Vaatii paljon huomiota | 0 1 2 54. On liian väsynyt | |
| 0 1 2 20. Rikkoo tai tuhoaa omia tavaroitaan | 0 1 2 55. On ylipainoinen. Paino: ____ kg. Pituus: ____ cm. | |
| 0 1 2 21. Rikkoo perheelleen tai muille kuuluvia tavaroita | 56. On ruumiillisia vaivoja ilman todettua lääketieteellistä syytä: | |
| 0 1 2 22. On tottelematon kotona | 0 1 2 a. Särkyä tai kipuja (ei päänsärky) | |
| 0 1 2 23. On tottelematon koulussa | 0 1 2 b. Päänsärky | |
| 0 1 2 24. Syö huonosti | 0 1 2 c. Pahoinvointia, sairaalloinen. | |
| 0 1 2 25. Ei tule toimeen muiden lasten kanssa | 0 1 2 d. Silmävaivoja (Kuvaile): | |
| 0 1 2 26. Ei näytä tuntevan syyllisyyttä käyttäytyttyään huonosti | 0 1 2 e. Ihottumaa tai muita iho-ongelmia | |
| 0 1 2 27. On helposti kateellinen | 0 1 2 f. Vatsakipu | |
| 0 1 2 28. Syö tai juo muuta kuin ruoka-aineita - ei tarkoita makeisia. (Kuvaile): | 0 1 2 g. Oksentelua | |
| 0 1 2 29. Pelkää tiettyjä eläimiä, tilanteita tai paikkoja - muuta kuin koulua. (Kuvaile): | 0 1 2 h. Muuta (Kuvaile): | |
| 0 1 2 30. Pelkää koulun menoa | 0 1 2 57. Hyökkää toisten kimppuun, esim. lyö toisia | |
| 0 1 2 31. Pelkää ajattelevansa tai tekevänsä jotain paha. (Kuvaile): | 0 1 2 58. Nyppii ihoaan, nenäänsä tai muita ruumiinosiaan. (Kuvaile): | |
| 0 1 2 32. Tuntee, että hänen on oltava täydellinen | 0 1 2 59. Leikkii sukupuolielimillään julkisesti | |
| 0 1 2 33. Tuntee tai valittaa, että kukaan ei rakasta häntä | 0 1 2 60. Leikkii sukupuolielimillään liian paljon | |
| 0 1 2 34. Tuntee toisten uhkaavan tai vainoavan itseään | 0 1 2 61. Selviytyy huonosti koulutyöstä | |
| 0 1 2 35. Tuntee olevansa arvoton tai huonompi kuin muut | 0 1 2 62. On kömpelö, liikkeiden koordinaatio on huono | |

0 = Ei sovi lainkaan

1 = Sopii jossain määrin tai toisinaan

2 = Sopii erittäin hyvin tai usein

| | | | |
|-------|---|-------|---|
| 0 1 2 | 63. On mieluiten itseään vanhempien lasten kanssa | 0 1 2 | 97. Uhkailee muita ihmisiä |
| 0 1 2 | 64. On mieluiten itseään nuorempien lasten kanssa | 0 1 2 | 98. Imee peukalooaan |
| 0 1 2 | 65. Kieltäytyy puhumasta | 0 1 2 | 99. On liian huolissaan järjestyksestä tai siisteydestä |
| 0 1 2 | 66. Toistaa tiettyjä toimintoja uudelleen ja uudelleen, on pakotoimintoja. (Kuvaile): | 0 1 2 | 100. Nukkumisongelmia. (Kuvaile): |
| 0 1 2 | 67. Karkaa kotoa | 0 1 2 | 101. Pinnaa koulusta |
| 0 1 2 | 68. Huutaa paljon | 0 1 2 | 102. On vetämätön, hidasliikkeinen ja voimaton |
| 0 1 2 | 69. Vaitelias, pitää asiat itsellään | 0 1 2 | 103. On onneton, surullinen tai masentunut |
| 0 1 2 | 70. Näkee asioita, joita ei ole. (Kuvaile): | 0 1 2 | 104. On epätavallisen äänekäs |
| 0 1 2 | 71. On vaivautunut, menee helposti hämilleen | 0 1 2 | 105. Käyttää alkoholia tai muita huumausaineita |
| 0 1 2 | 72. Syyttää tulipaloja | 0 1 2 | 106. Tuhoaa ja rikkoo paljon |
| 0 1 2 | 73. Seksuaalisuuteen liittyviä ongelmia. (Kuvaile): | 0 1 2 | 107. Päiväkastelua |
| 0 1 2 | 74. Yrittää tehdä vaikutuksen tai pelleilee | 0 1 2 | 108. Yökastelua |
| 0 1 2 | 75. On ujo | 0 1 2 | 109. Marisee ja kitisee |
| 0 1 2 | 76. Nukkuu vähemmän kuin useimmat lapset | 0 1 2 | 110. Toivoisi olevansa vastakkaista sukupuolta |
| 0 1 2 | 77. Nukkuu päivällä ja/tai yöllä enemmän kuin useimmat lapset. (Kuvaile): | 0 1 2 | 111. On vetäytyvä, ei liity muiden seuraan |
| 0 1 2 | 78. Sotkee tai leikkii ulosteella | 0 1 2 | 112. On huolestunut |
| 0 1 2 | 79. Puhevaikeuksia. (Kuvaile): | 0 1 2 | 113. Jos lapsellasi on muita kuin edellä lueteltuja ongelmia, kirjoittaisitko ne tähän: |
| 0 1 2 | 80. Tuijottaa ilmeettömästi | | |
| 0 1 2 | 81. Varastaa kotoa | | |
| 0 1 2 | 82. Varastaa kodin ulkopuolelta | | |
| 0 1 2 | 83. Kerää tavaroita, joita ei tarvitse. (Kuvaile): | | |
| 0 1 2 | 84. Outoa käyttäytymistä. (Kuvaile): | | |
| 0 1 2 | 85. Outoja ajatuksia. (Kuvaile): | | |
| 0 1 2 | 86. On itsepäinen, juro tai ärtyisä | | |
| 0 1 2 | 87. Mielialat tai tunteet vaihtelevat äkillisesti | | |
| 0 1 2 | 88. Murjottaa paljon | | |
| 0 1 2 | 89. On epäluuloinen | | |
| 0 1 2 | 90. Kiroilee tai käyttää rivoa kieltä | | |
| 0 1 2 | 91. Puhuu itsensä tappamisesta | | |
| 0 1 2 | 92. Puhuu tai kävelee unissaan. (Kuvaile): | | |
| 0 1 2 | 93. Puhuu liian paljon | | |
| 0 1 2 | 94. Kiusaa paljon muita | | |
| 0 1 2 | 95. Saa raivokohtauksia tai on kiivasluontoinen | | |
| 0 1 2 | 96. Ajattelee liikaa seksiasioita | | |

Ole ystävällinen ja tarkista, että olet vastannut kaikkiin kysymyksiin.

Alleviivaa niitä kohtia, joista olet huolissasi, jos sellaisia on!

KIITOS VASTAUKSISTA!

Mikäli vielä haluat kertoa jotain lapsestasi, voit käyttää alla olevaa tilaa siihen.

Appendix 4. The Edinburgh Postnatal Depression Scale.

KYSYMYKSIÄ MIELIALASTA

___/___/___

Alleviivaa se vastaus, joka parhaiten kuvastaa seitsemän viime päivän aikana kokemiasi tuntemuksia ja vointia. Älä siis vastaa pelkästään tämänpäiväisen vointisi perusteella. Kaikki 10 kohtaa tulee täyttää.

7 viime päivän aikana

1) Olen kyennyt nauramaan ja näkemään asioiden huvittavan puolen.

1. Yhtä hyvin kuin aina ennenkin.
2. Jonkin verran huonommin kuin ennen.
3. Selvästi huonommin kuin ennen.
4. En lainkaan.

___/___

2) Olen odottanut innokkaasti asioita ja tapahtumia.

1. Yhtä paljon kuin ennen.
2. Jonkin verran vähemmän kuin ennen.
3. Selvästi vähemmän kuin ennen.
4. Tuskin lainkaan.

___/___

3) Olen moittinut itseäni tarpeettomasti, kun asiat ovat sujuneet huonosti.

1. Kyllä, useimmiten.
2. Kyllä, toisinaan.
3. Ei, en kovin usein.
4. Ei, en ollenkaan.

___/___

4) Olen ollut ahdistunut ja huolestunut ilman syytä.

1. Ei, en lainkaan
2. Ei, tuskin ollenkaan.
3. Kyllä, joskus.
4. Kyllä, hyvin usein.

___/___

5) Olen ollut peloissani ja kauhuissani ilman kovin selkää syytä.

1. Kyllä, aika usein.
2. Kyllä, joskus
3. Ei, enpä juuri.
4. Ei, en lainkaan.

___/___

6) Asiat ovat käyneet yli voimieni.

1. Kyllä, enimmäkseen en ole kyennyt selviytymään ollenkaan.
2. Kyllä, toisinaan en ole kyennyt selviytymään yhtä hyvin kuin tavallisesti.
3. Ei, enimmäkseen olen selviytynyt aika hyvin.
4. Ei, olen selviytynyt yhtä hyvin kuin ennenkin.

___/___

KÄÄNNÄ!

7) Olen ollut niin onneton, että olen nukkunut huonosti

1. Kyllä, enimmäkseen.
2. Kyllä, joskus.
3. Ei, en kovin usein.
4. Ei, en ollenkaan.

___/___

8) Minulla on ollut surullinen ja kurja olo.

1. Kyllä, suurimman osan ajasta.
2. Kyllä, aika usein.
3. Ei, ei kovin usein.
4. Ei, ei lainkaan.

___/___

9) Olen ollut niin onneton, että olen itkenyt.

1. Kyllä, hyvin usein.
2. Kyllä, aika usein.
3. Ei, ei kovin usein.
4. Ei, ei lainkaan.

___/___

10) Mieleeni on tullut ajatus, että vahingoittaisin itseäni.

1. Kyllä, aika usein.
2. Kyllä, joskus.
3. Ei, tuskin koskaan.
4. Ei, ei koskaan.

___/___

(Cox JL, Holden JM, Sagovsky R. Detection of Postnatal Depression. Br J Psychiatry 1987; 150: 782-786. Suomenkielinen versio: Perheentupa A. Synnytyksen jälkeinen masennus – onko vika hormoneissa? Suomen Lääkärilehti 2003; 58(4): 387-391.)

Appendix 5. The questionnaire on Separation Experiences for preterm children.

Tutkimukseen osallistuvan lapsen nimi _____

Lomakkeen täyttöpäivä _____

Lomakkeen täyttäjä _____

LAPSEN KOKEMAT EROTILANTEET

Pyydämme Teitä vastaamaan seuraaviin kysymyksiin joko ympäröimällä sopivan vaihtoehdon numeron tai kirjoittamalla vastauksen sille varatulle riville; tarvittaessa voitte jatkaa vastausta marginaaliin. Kysymyksissä 4-5, 10-11 ja 15-16 pyydetään arvioimaan, miltä erotilanteet tuntuvat, laittamalla rasti viivalle siihen kohtaan, joka parhaiten vastaa arviointianne; rasti voi olla muuallakin kuin merkittyjen pisteiden kohdalla.

VÄLTTÄMÄTTÖMÄT EROTILANTEET

1. Onko lapsenne ollut sairaalahoidossa vastasyntyneiden osastolta kotiutumisen jälkeen?

- 1 ei (siirtykää kysymykseen 6)
2 kyllä

2. Kuinka monta kertaa lapsenne on ollut sairaalassa?

3. Miten pitkiä lapsenne sairaalahoitosot ovat olleet (kirjatkaa vastaus päivissä)?

4. Arvioikaa alla olevalla asteikolla, miltä Teistä on tuntunut jättää lapsi sairaalaan (jos sairaalahoitojaksoja on ollut useampia, niin arvioikaa jättämisen vaikeutta yleensä).

helpolta _____ vaikealta

5. Arvioikaa alla olevalla asteikolla, miltä lapsesta on tuntunut jäädä sairaalaan (jos sairaalahoitojaksoja on ollut useampia, niin arvioikaa jäämisen vaikeutta yleensä).

helpolta _____ vaikealta

kääntäkää

VAPAAEHTOISET EROTILANTEET

1. Onko lapsenne ollut yötä poissa kotoa ilman vanhempia?

- 1 ei koskaan(*siirtykää kysymykseen 12*)
- 2 1 – 5 kertaa
- 3 6 kertaa tai enemmän

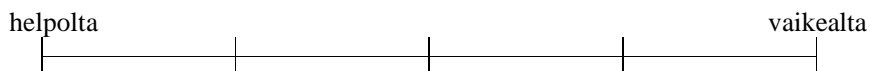
2. Minkä ikäisenä lapsi oli ensimmäistä kertaa yötä poissa kotoa ilman vanhempia?

_____ v _____ kk

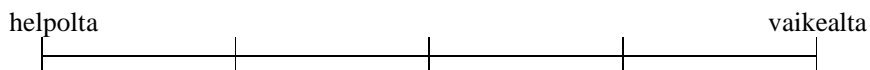
3. Miten pitkään lapsenne on ollut poissa kotoa (kirjatkaa vastaus päivissä)?

4. Jos lapsenne on ollut poissa kotoa yli viikon ajan, niin missä hän on ollut ja miksi?

5. Arvioikaa alla olevalla asteikolla, miltä Teistä tällä hetkellä tuntuu jättää lapsi muille hoitoon.



6. Arvioikaa alla olevalla asteikolla, miltä lapsesta tällä hetkellä tuntuu jäädä muille hoitoon.



PÄIVÄHOITO

1. Onko lapsenne ollut päivähoidossa?

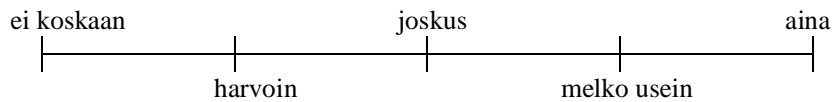
- 1 ei koskaan (*siirtykää kysymykseen 17*)
- 2 kyllä, aiemmin (*jättäkää vastaamatta kysymyksiin 15 ja 16*)
- 3 kyllä, tällä hetkellä

2. Minkä ikäisenä lapsi meni päivähoitoon ensimmäisen kerran?

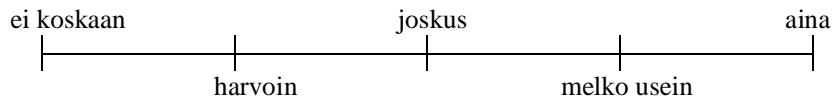
_____ v _____ kk

3. Kuinka kauan hän on kaiken kaikkiaan ollut päivähoidossa?

4. Onko Teidän tällä hetkellä vaikea jättää lastanne päivähoitoon?



5. Onko lapsenne tällä hetkellä vaikea jäädä päivähoitoon?



6. Jos Teillä olisi mahdollisuus järjestää lapsenne päivähoito toivomallanne tavalla, niin miten järjestäisitte sen?

KIITÄMME AVUSTANNE!

Appendix 6. The questionnaire on Separation Experiences for full-term children.

Tutkimukseen osallistuvan lapsen nimi _____

Lomakkeen täyttöpäivä _____

Lomakkeen täyttäjä _____

LAPSEN KOKEMAT EROTILANTEET

Pyydämme Teitä vastaamaan seuraaviin kysymyksiin joko ympäröimällä sopivan vaihtoehdon numeron tai kirjoittamalla vastauksen sille varatulle riville; tarvittaessa voitte jatkaa vastausta marginaaliin. Kysymyksissä 4-5, 10-11 ja 15-16 pyydetään arvioimaan, miltä erotilanteet tuntuvat, laittamalla rasti viivalle siihen kohtaan, joka parhaiten vastaa arviointianne; rasti voi olla muuallakin kuin merkittyjen pisteiden kohdalla.

VÄLTTÄMÄTTÖMÄT EROTILANTEET

1. Onko lapsenne ollut sairaalahoidossa syntymänsä jälkeen?

- 1 ei (siirtykää kysymykseen 6)
2 kyllä

2. Kuinka monta kertaa lapsenne on ollut sairaalassa?

3. Miten pitkiä lapsenne sairaalahoitojakso ovat olleet (kirjatkaa vastaus päivissä)?

4. Arvioikaa alla olevalla asteikolla, miltä Teistä on tuntunut jättää lapsi sairaalaan (jos sairaalahoitojaksoja on ollut useampia, niin arvioikaa jättämisen vaikeutta yleensä).

helpolta _____ vaikealta

5. Arvioikaa alla olevalla asteikolla, miltä lapsesta on tuntunut jäädä sairaalaan (jos sairaalahoitojaksoja on ollut useampia, niin arvioikaa jäämisen vaikeutta yleensä).

helpolta _____ vaikealta

kääntäkää

VAPAAEHTOISET EROTILANTEET

1. Onko lapsenne ollut yötä poissa kotoa ilman vanhempia?

1 ei koskaan(*siirtykää kysymykseen 12*)

2 1 – 5 kertaa

3 6 kertaa tai enemmän

2. Minkä ikäisenä lapsi oli ensimmäistä kertaa yötä poissa kotoa ilman vanhempia?

_____ v _____ kk

3. Miten pitkään lapsenne on ollut poissa kotoa (kirjatkaa vastaus päivissä)?

4. Jos lapsenne on ollut poissa kotoa yli viikon ajan, niin missä hän on ollut ja miksi?

5. Arvioikaa alla olevalla asteikolla, miltä Teistä tällä hetkellä tuntuu jättää lapsi muille hoitoon.

helpolta



vaikealta

6. Arvioikaa alla olevalla asteikolla, miltä lapsesta tällä hetkellä tuntuu jäädä muille hoitoon.

helpolta



vaikealta

PÄIVÄHOITO

1. Onko lapsenne ollut päivähoidossa?

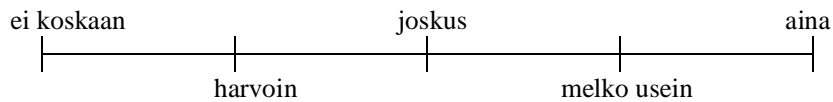
- 1 ei koskaan (*siirtykää kysymykseen 17*)
- 2 kyllä, aiemmin (*jättäkää vastaamatta kysymyksiin 15 ja 16*)
- 3 kyllä, tällä hetkellä

2. Minkä ikäisenä lapsi meni päivähoitoon ensimmäisen kerran?

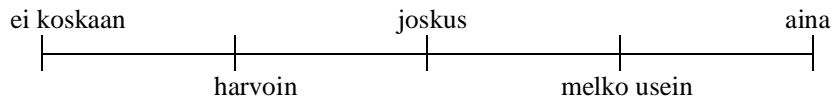
_____ v _____ kk

3. Kuinka kauan hän on kaiken kaikkiaan ollut päivähoidossa?

4. Onko Teidän tällä hetkellä vaikea jättää lastanne päivähoitoon?



5. Onko lapsenne tällä hetkellä vaikea jäädä päivähoitoon?



6. Jos Teillä olisi mahdollisuus järjestää lapsenne päivähoito toivomallanne tavalla, niin miten järjestäisitte sen?

KIITÄMME AVUSTANNE!

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Visiting Less Than Every Day

A Marker for Later Behavioral Problems in Finnish Preterm Infants

Reija Latva, MD; Liisa Lehtonen, MD; Raili K. Salmelin, PhD; Tuula Tamminen, MD

Objective: To investigate the effect of parental visits during neonatal intensive care on the behavioral and emotional development of the child at school age.

Design: All premature infants born in Tampere University Hospital in Tampere, Finland, in 1989 who were admitted to the neonatal intensive care unit and who lived in the Tampere region (N=67; 31 boys and 36 girls) formed the study group. Data on parental visits were collected from the hospital records. Child behavior was evaluated according to the Achenbach Child Behavior Checklist at the age of 7 to 8 years. A total of 48 (72%) of the mothers returned the questionnaires.

Results: The median number of visiting days per week was 6.2 for the mothers and 4.7 for the fathers. The children whose mothers visited daily had fewer behavioral and emotional problems at school age than those who

had had fewer visits from their mothers ($P = .04$). The visiting frequency of the fathers was not significantly associated with later behavioral and emotional problems of the child. In this study, infrequent visits by the mother were a stronger risk factor for later psychological development than the medical risks of the preterm infant.

Conclusions: Infrequent visits by mothers to the neonatal intensive care unit seem to be a marker for their children's later behavioral and emotional problems. This emphasizes the significance of early parent-infant contact and the vulnerability in early interaction. Less frequent visits may also indicate factors influencing the parent-child relationship in a way that leads to subsequent behavioral problems.

Arch Pediatr Adolesc Med. 2004;158:1153-1157

THE BIRTH AND OFTEN LONG-term hospitalization of a premature infant are stressful for the parents. According to Miles et al,¹ the most stressful features in the neonatal intensive care unit (NICU) for parents were the alterations in the parental role and the appearance and behavior of their infants. The medical condition of the newborn, parental stress, and the environment of the NICU complicate the development of close contact and early interaction between the newborn and his or her parents. In addition, separation caused by hospitalization disturbs parent-infant interaction and may have an effect on the developing parent-child relationship.

In the seventies, researchers suggested that early contact in the first few hours after birth was of great importance and affected the subsequent parent-child relationship.² During subsequent decades, the developing care practices in the NICUs have increasingly supported and encouraged parents to visit the NICU and to participate in

the neonatal care of the infant. However, only a few studies have examined parental visits to the NICU. Older studies indicate that parents tend to visit infrequently, but newer studies report more regular parental visiting patterns.³⁻⁷

Parental visitation has been shown to be associated with demographic factors. Parents' low socioeconomic status, parents' not living together, and a child with a birth order of 2 or higher have been shown to be associated with less frequent visits.⁸ Mothers have been found to visit more often than fathers.^{3,4} Infrequent visitation has been associated with poor outcome. Fanaroff et al⁹ showed in their study, conducted in NICU settings of the 1960s, that a low visiting frequency (less than 3 visits per 2 weeks) at NICUs by mothers of low-birth-weight infants was associated with a poor outcome, including abandoning, battering, nonorganic failure to thrive, or foster care. It is not known whether small differences in the current visiting frequencies contribute to later behavioral and emotional problems of preterm infants.

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Our aim was to study the long-term effects of parents' visiting frequency during the NICU period on the later behavioral and emotional problems of the child.

METHODS

The study was conducted at the Tampere University Hospital in Tampere, Finland, in 1996-1997. Data were retrospectively collected from the hospital records of the mother and the infant, including the parental visits to the NICU. The behavioral and emotional problems of the child were evaluated by questionnaires in spring 1997, when the children were at the age of 7 to 8 years, corresponding to the completion of the first grade of school in Finland. We decided to study this age group because starting school is one of the important turning points in the life of a child. Possible vulnerability, especially to separation anxiety, may be manifested as behavioral and emotional problems in this life situation. The study has been approved by the Pirkanmaa Hospital District's ethics committee.

The study population consisted of all premature infants who were born in the Tampere University Hospital in 1989, who were admitted to the NICU from the delivery room, and who lived in the Tampere region (N=79). Prematurity was defined as birth weight of less than 2500 g and/or gestational age of less than 37 weeks. Only those infants who were capable of attending regular school at 7 years of age were included. This criterion excluded 8 disabled children. In addition, 3 children had died, and 1 child was excluded from the study because she had recently lost her mother. Of the study population, 67 children (31 boys and 36 girls) met the inclusion criteria, and their parents received the questionnaires. Forty-eight (72%) of the questionnaires were returned. One of them was incomplete and therefore excluded. The mothers sent informed consent forms for the study with the questionnaires. There were no significant differences between the visiting frequencies of the parents who returned the questionnaires and those who did not. In the sample, there were 8 sets of twins, 5 of which were intact and in which both children met the inclusion criteria. From these children, 4 pairs were discharged from the hospital at the same time. In 3 pairs, a twin brother or sister died during the neonatal period. In the sample, there was also 1 set of triplets in which only 1 child met the inclusion criteria and was accepted for the study; the other 2 children were excluded from the study because they were not admitted to the NICU in the neonatal period.

The data collected from the hospital records of each infant included birth weight and height, gestational age at birth, diagnoses, Apgar scores, and the following data concerning the medical care in the NICU: the length of the NICU period, the length of stay in the incubator, the duration of ventilator treatment and supplementary oxygen, and the duration of intravenous fluids and tube feeding. The data collected from the hospital records of the mother included maternal age, profession, marital status, and previous pregnancies. The socioeconomic status of the parents was based on their professions and divided into 7 categories according to the classification of the Central Statistical Office of Finland: self-employed persons; upper-level employees with administrative, managerial, professional, and related occupations; lower-level employees with administrative and clerical occupations; manual workers; students; pensioners; and others. The socioeconomic status of the family was considered to be that of the mother or the father, whichever was higher. For purposes of the analysis, 2 categories were used, the upper class composed of the first 3 categories, the rest of the categories falling into the lower class.

Data of the visits of the mother and the father were collected from the hospital records of the infant. The NICU of the

Tampere University Hospital had an unrestricted visitation policy for the parents and siblings. The NICU nurses documented all visits of the parents in every 3-hour period as a part of nursing charting. Complete hospital records were available for every infant, and the notes were clearly made.

The Child's Behavioral Checklist (CBCL)¹⁰ questionnaires were mailed to the children's mothers. The CBCL is an internationally used and standardized questionnaire developed to screen children's behavioral and emotional problems and disorders. For this study, we used the part of the questionnaire assessing behavioral and emotional problems, excluding items for social competence. This part contains 118 items and 2 open-ended questions for the parents to report possible concerns. The items were graded as 0 (not true), 1 (somewhat or sometimes true), or 2 (often true or very true). The raw sum scores across all items were converted into normalized T scores based on percentiles of normative samples of children standardized for different age and sex groups. The normative data were obtained from the US national sample.¹⁰ However, cross-cultural comparisons have yielded relatively small differences in the rates of behavioral and emotional problems and syndrome structure.¹¹ The children were divided into 3 groups: normal cases (T score under 60), borderline cases (T score 60-63), and clinical cases (T score over 63). The normal procedure when using the CBCL without clinical evaluation of the child is to include the borderline and clinical cases in the analysis.¹⁰

Because of the wide variation in the length of NICU periods, the parental visiting frequencies for each child were calculated as proportionate to the length of the respective NICU period. Thus, the number of parental visiting days per week is reported. The resulting values were rounded to integers.

The material was described by simple frequencies as well as means and standard deviations or medians and quartiles, as appropriate. First, the associations of the dependent variable and the independent variables of interest were examined pairwise by cross-tabulations (χ^2 as a significance test). The categorizations of the variables were performed in such a manner that they took into account the variability of the variables and gave suitable cell-sizes for calculations. In some cases, this resulted in different cut-off values for similar variables (eg, the mother's visiting frequency per week being 0-6 and 7, the father's being 0-4 and 5-7). To investigate the simultaneous effects of variables, logistic regression analysis was applied. The pairwise analyses were accomplished with the SPSS package versions 6.0 and 11.0 for Windows (SPSS Inc, Chicago, Ill). For the logistic regression analysis, the LogXact program version 4 (CYTEL Software Corp, Cambridge, Mass) was used because its exact method is the most suitable one for a small number of cases.

RESULTS

In the final study sample, there were 23 (49%) boys and 24 (51%) girls. The mean \pm SD age of the mothers was 29 \pm 5 years (range, 20-44 years) when the child was born. Two percent of the mothers were self-employed persons, 10% were upper-level employees, 65% lower-level employees, and 23% manual workers. Of the fathers, 29% were upper-level employees, 33% lower-level employees, 35% manual workers, and 2% students. More than half (55%) of the mothers were married, and 89% were married or living in common-law marriage at that time. Sixty-six percent of the mothers did not have other children, 23% of the mothers had 1 child, and the rest had 2 or more children.

Mothers visited the NICU on average 6.2 days (range, 2.3-7.0 days) per week, whereas fathers visited on average 4.7 days per week (range, 1.8-6.6 days). Twenty-eight percent of the mothers visited their infants in the NICU every day. Only 2% of the fathers visited their infants 7 days per week. The number of the parents' visits was independent of the sex of the infant. The visiting frequency of the parents was also independent of the length of the NICU period of the infant (**Figure 1**). The length of periods when neither of the parents visited ranged from 0 to 7 days. We wanted to examine if the existence of nonvisiting days by the mother affected the child's behavioral and emotional development. Therefore, we divided the families into those whose mothers visited daily and those with less frequent maternal visits. There were no significant differences in the demographic and infant factors between these groups (**Table**).

According to the CBCL, clinical behavioral and emotional problems were found in 6 and borderline problems in 4 of 47 children (13% and 9%, respectively). There were no statistically significant differences between girls and boys in the parental assessment.

All of the children with borderline or clinical CBCL scores had experienced nonvisiting days by their mothers. None of the children whose mothers had visited daily had behavioral and emotional problems according to CBCL ($P=.04$) (**Figure 2**). There was no statistically significant association between the visiting frequency of the father and the child's subsequent emotional and behavioral problems.

Logistic regression analysis used to find the strongest factors affecting CBCL was completed in 2 stages to reduce the number of independent variables per analysis. The reliable and contextually reasonable, non-normally distributed independent variables were categorized appropriately as suggested by the cross-tabulations and divided into 4 blocks (2 for the infant, 1 for the mother and the family, and 1 for the NICU period). First, a separate stepwise logistic regression analysis was completed for each block. Second, the variables with P values less than the removal limit of .10 were entered into the final model. Mother's daily visiting offered protection for high CBCL scores as compared with less frequent visits (odds ratio, 0.2; $P=.07$; 95% confidence interval, 0-1.2), whereas a hospital stay longer than a month resulted in a 5.5-fold risk for CBCL scores greater than 60 ($P=.10$; 95% confidence interval, 0.8-46.9). Mother's age remained in the model as a non-significant factor. The blocks including gestational age and birth weight of the infant were insignificant and were removed from the model.

COMMENT

This study shows that the frequency of the mother's visits to the NICU was associated with the long-term behavioral and emotional development of the child. Specifically, daily visits by the mother were associated with fewer behavioral and emotional problems at 7 years of age. The impact of the mother's visits was stronger than

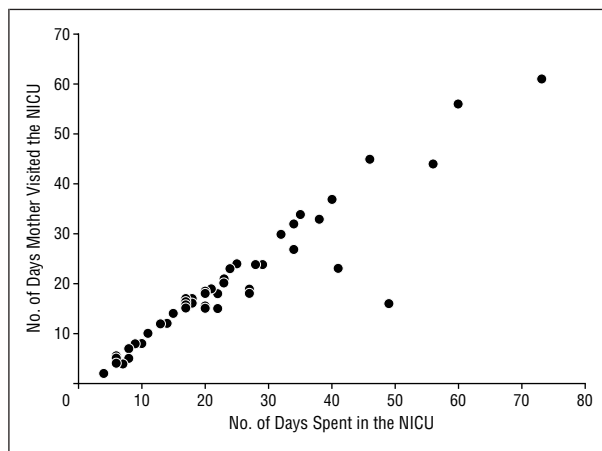


Figure 1. The association between the length of hospital stay of the infants ($n=47$) and the number of days the mothers visited them in the neonatal intensive care unit (NICU).

Table. Demographic Factors of the Family and Factors of the Infants in the Groups of Mothers Visiting Daily and Mothers Visiting Less Than Daily*

| | Visiting Frequency | |
|--|------------------------------|-----------------------------|
| | Every Day | Less Than Every Day |
| Demographic factors | | |
| Age of the mother, y† | 31 (26, 34); 23-44 | 28 (25, 30); 20-42 |
| Socioeconomic status of the family, ‡ % | | |
| Lower | 15 | 17 |
| Upper | 85 | 83 |
| Marital status, % | | |
| Married | 58 | 67 |
| Unmarried | 42 | 33 |
| Birth order of the infant, % | | |
| Firstborn | 62 | 69 |
| Later born | 38 | 31 |
| Factors of the infant | | |
| Sex of the infant, % | | |
| Boy | 46 | 49 |
| Girl | 54 | 51 |
| Gestational age, completed weeks† | 35 (32, 35); 28-37 | 35 (33, 36); 27-36 |
| Birth weight, g† | 2020 (1410, 2475); 1150-2730 | 2060 (1525, 2290); 700-3160 |
| Duration of the ventilator treatment, d† | 0 (0, 3); 0-28 | 0 (0, 0); 8-48 |
| Duration of supplemental oxygen, d† | 2 (2, 9); 0-25 | 2 (0, 2); 0-32 |
| Length of stay in the incubator, d† | 12 (4, 21); 0-41 | 6 (4, 13); 0-68 |
| Length of stay in the NICU, d† | 24 (17, 35); 15-60 | 20 (10, 29); 4-99 |

Abbreviation: NICU, neonatal intensive care unit.

* P values were not significant.

†Data presented as median (lower quartile, upper quartile); range.

‡Two categories were used, the upper class comprising self-employed persons and upper-level and lower-level employees and the lower class comprising manual workers, students, pensioners, and others.

the impact of gestational age, birth weight, or the medical risks of the infant.

In this study, mothers and fathers visited the NICU more often than in previous studies.^{4,5} The documenta-

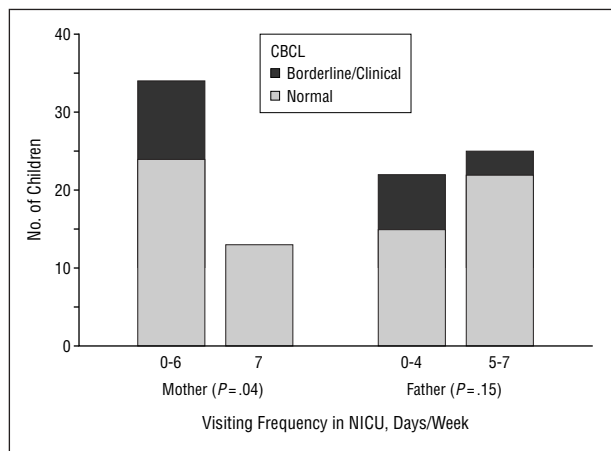


Figure 2. The association between parental visiting frequency in the neonatal intensive care unit (NICU) and later Child Behavior Checklist (CBCL) assessment at 7 to 8 years of age (n=47).

tion of their visits in the medical records was accessible and meticulously noted. There may be various causes for the higher parental visitation frequency. The improved survival of premature infants has encouraged parents to participate and has obviously affected parental visits to the NICU. The parental visiting in this study may also be influenced by such background factors as a homogeneous population and a high educational level in Finland, a low rate of teenage pregnancies (none of the mothers in our study was younger than 20 years), a low rate of single parenting (11%), and a small family size (65% of the infants studied were firstborn).^{4,5} The visiting frequency and its impact may be different in countries with more heterogeneous populations and with lower parental visiting frequencies, and, therefore, our results may not be generalizable in such cases.

A limitation of our study is the relatively small size of the study group. Visiting frequency, however, seems to have a robust influence on child development because it emerged as a significant factor despite the small study groups. Although the mother's low visiting frequency was related to the long-term behavioral and emotional developmental problems of the child, we could not demonstrate the same for the fathers on a statistically significant level. This may be due to an insufficient power to show a significant difference for the fathers because we found a trend for fathers' lower visiting activity to be a protective factor too.

The frequency of maternal visits to the NICU seems to be a clear marker of the risk for later behavioral and emotional problems. Infrequent maternal visits may reflect underlying factors influencing mother-infant interaction and child behavior. Infrequent visits may be caused by the mother's difficulties in bonding with the baby. The mother may have delayed maternal response or feelings of hostility and rejection regarding the infant. Other risk factors that may affect infrequent maternal visits are maternal depression or other perinatal psychiatric problems or disorders.¹² Although not found in this study population, other studies have shown that low socioeconomic status, single parenting, and adolescent parenting are risk factors for having a

What This Study Adds

Although early separation has been suggested to have a negative effect on the development of the parent-child relationship, the role of parental visiting frequency in neonatal units has not been studied with regard to the later behavioral and emotional development of the preterm infant. Our study shows that daily visits by the mother to the neonatal intensive care unit were associated with fewer behavioral and emotional problems in the child. The lack of daily visits by the mother provides a simple indicator of a group of preterm infants who are at an increased risk for subsequent behavioral and emotional problems and in need of support and closer follow-up.

low-birth-weight infant and for a nonoptimal mother-infant relationship.¹³

On the other hand, the visitation frequency may not be just an indicator of underlying problems. Early separation negatively affects the mother-infant relationship, which is a key factor in the mental development of the child. In mother-infant interaction, both mother and infant are active participants from the time of the birth of the infant, and the important attachment relationship develops during the first year of the infant's life. The infant wishes to maintain proximity to the parent, seeks security and comfort from the relationship, and feels distress at involuntary separation. In earlier studies, preterm infants did not appear to be at risk for severely abnormal attachment to their mothers and fathers.^{14,15} However, in more recent studies, extremely preterm infants have been shown to have an unusually high amount of atypical attachment patterns.¹⁶ The latest attachment and developmental studies in the neurosciences provide new support for the idea that there may be different sensitive periods for human interaction in early child development.^{17,18}

In conclusion, frequent parental visits seem to be an excellent marker for the normal development of the later mental health of a preterm infant. A separation caused by hospitalization may complicate the start of the early interaction. Frequent parental visits could promote the development of the parent-child relationship. The lack of daily visits by the mother provides a simple and inexpensive indicator of a group of children at an increased risk for subsequent behavioral and emotional problems. This group is therefore in need of support and closer follow-up. In the future, intervention studies could tell us whether modification of parental visiting frequency would change parent-child interaction and child development.

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Visits by the family to the neonatal intensive care unit

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Abstract

Aim: To investigate visiting frequency of family members, including mother, father, siblings and grandparents and associated factors during hospitalisation of preterm infants.

Methods: The study included all premature (< 37 weeks) infants born in Tampere University Hospital in 1997–1998 admitted to the neonatal intensive care unit (NICU) with a birth weight less than 2500 g (n = 210). Maternal and infant data and visits made by family members were compiled from the infants' hospital records.

Results: The length of the infants' hospitalisation varied from 2 to 133 days (median 26, quartiles 19, 45). Mothers visited the NICU on average 6.7 days/week; fathers 4.8 days/week. Mothers visited less frequently the lower the gestational age and the longer the distance between home and hospital. Fathers visited less frequently if distance from home to hospital was longer and if the infant had siblings. A total of 92% of siblings and 80% of grandparents visited the hospital.

Conclusions: The results showed active visiting by the parents in the NICU. A lower gestational age was associated with lower visiting frequency for mothers. In contrast, more practical limitations such as geographical distance and other children to be taken care of had greater effect on the visiting frequency for fathers.

INTRODUCTION

The long time preterm infants often spend in hospital presents a challenge for the parents on both a practical and an emotional level, and may complicate early parent–infant interaction. Therefore liberal parental visits have become a standard in neonatal units. Despite the importance of visiting by the parents, only few studies have examined parental visiting frequency and its consequences. More recent studies report more regular parental visiting patterns (1,2) compared to older studies (3,4). Mothers are reported to visit more often than fathers. In our earlier study, we found an association between the less frequent maternal visits and later behavioural problems of the child (5).

Sibling and grandparent visiting policies vary greatly among NICUs in Europe, ranging from no visiting to open visiting (6). Visiting by siblings is suggested to be beneficial to the siblings (7–9) and their families and is recommended by the American Academy of Pediatrics Committee on Fetus and Newborn (10). The grandparents' visiting has been suggested to be important to the parents of the premature infants, especially to the mothers (11–13).

Studies exploring factors affecting parental visits have been carried out in different cultures and social groups. In addition, the visiting frequency in some of the studies is based on retrospective parental report. Less frequent visiting by the parents is related to low socioeconomic status (14–16), long distance from the hospital (16,17), single parenting (14,15) and larger number of other children at home (2,14) and longer hospital stay of the infants (2,14; Table 1). As a whole, only few researchers have studied other

than geographical and family factors or the simultaneous effects of the different factors on parents' visits to the NICU. Furthermore, to our knowledge, no one has studied the visiting frequency of the siblings and grandparents and the factors affecting their visiting. The aim of this study was, therefore, to explore the visiting frequency of the parents, siblings and grandparents during a liberal visiting policy and to evaluate the medical and family issues affecting their visiting frequency.

PATIENTS AND METHODS

All the premature (< 37 weeks) infants born in the Tampere University Hospital (TAUH) in 1997–1998 (N = 349) formed the study population. Those infants who were admitted to the NICU of the TAUH from the delivery room and who stayed there until discharge and whose birth weight was 2500 g or less were included in the study (n = 210). These criteria excluded 65 children whose birth weight was over 2500 g and six children whose gestational age was 37 weeks or more. In addition, 29 children were admitted to another hospital before discharge, 33 children had died and six children had other reasons like being adopted or being of foreign origin. Of those 210 children, 106 were boys and 104 girls. The birth weight of 49 infants (23%) was less than 1500 g and that of eight infants (4%) less than 1000 g. A total of 57 infants (27%) were born at a gestational age of less than 32 weeks. In this study, sample there were 36 twins and three triplets. Such a heterogeneous group of premature infants was selected to be able to investigate various

Table 1 Factors affecting visitation of the parents according to the literature

| Factor examined | Potential explanatory variables | | | |
|-----------------------------|---------------------------------|--|---|---|
| | Premature infant | | Family factors | |
| Source | Decreased | No effect | Decreased | No effect |
| Visits by the parents | | | | |
| Lewis et al. (14) | IVH Hospital stay (longer) | Gender Condition of the infant | Socioeconomic status (lower) Single parenting Siblings | Condition of the mother |
| Brown et al. (15) | | | Socioeconomic status (lower) Single parenting | |
| Giacoaia et al. (16) | | | Socioeconomic status (lower) Distance from hospital to home (longer) | |
| Visits by the mother | | | | |
| Franck et al. (2) | Hospital stay over 1 month | | Siblings | |
| Reid et al. (1) | Poor condition | | | |
| Callahan et al. (17) | | Birth weight | Distance from hospital to home (longer) | |
| Visits by the father | | | | |
| Franck et al. (2) | Hospital stay over 1 week | | | Siblings |
| Callahan et al. 1991 (17) | Birth weight (lower) | | | Distance from hospital to home (longer) |
| Lewy-Shiff et al. 1990 (18) | | Condition of the infant Gender Birthweight | | Socioeconomic status Age of the father |

factors affecting the visiting of family members of all premature infants.

The NICU of TAUH has had a liberal visiting policy for the parents, siblings and grandparents for almost 20 years. There was one family room available for parents with a facility to prepare meals and rest. No childcare was available for siblings. Visits by siblings and grandparents were restricted during the out-break of respiratory syncytial virus during winter season 1997–1998. Data on the 210 infants were collected from the hospital records of each infant. Data concerning visits by the mother, father, siblings and grandparents were collected from a special chart included in the hospital record of the infant. The NICU nurses documented all visitors during intensive care in every 8-hour period and during convalescent care in every 3-hour period as a part of the nursing charting. Complete hospital records of every infant were available and the notes were legible and carefully coded for data analysis. The data collected on the infant included birth weight and height, gestational age at birth, diagnoses, Apgar scores, the length of the NICU period, the duration of ventilator treatment and supplementary oxygen and the duration of parenteral nutrition. These were used to estimate the sickness of the infant. The data collected on the mother included maternal age, marital status, place of domicile and number of previous pregnancies. The Pirkanmaa Hospital District ethics committee approved the study.

Because of the wide variation in the length of the NICU periods the parental visiting frequencies for each child were calculated proportionate to the length of the respective NICU period, i.e. the total number of visiting days was divided by the number of days spent in the NICU. The result was then multiplied by seven, thus representing the average number of visiting days per week, and, for categorisation purposes, rounded to integers. The information of the first

and the last NICU day were dropped out as the length of these varied considerably.

The material is described by simple frequencies as well as means (M) and standard deviations (SD) or medians (Md) and quartiles (Q1, Q3), as appropriate. Associations of the visiting frequencies with each other and the explanatory variables were first examined pair-wise by nonparametric methods (Mann–Whitney, Kruskal–Wallis, Wilcoxon and Spearman *r*).

To investigate the simultaneous effects of the explanatory variables on the nonnormally distributed parental visiting frequencies multivariate analyses were completed, as explained in the results. Backward stepwise logistic regression was applied to find the strongest explanatory variables. The results are reported as odds ratios (OR) and their 95% confidence intervals (95% CI). Results involving visiting frequencies of the parents and factors affecting them are calculated separately for infants who stayed in hospital for four weeks or less and for those who stayed more than four weeks. The analysis was accomplished with the SPSS package (version 11.5 for Windows).

RESULTS

The median length of stay in the NICU was 26 days (range from 2 to 133 days, Q1 19, Q3 45). Characteristics of the infants are shown in Table 2. A total of 16% of the infants had respiratory distress syndrome, 7% bronchopulmonary dysplasia, 5% intraventricular hemorrhage, and 5% necrotizing enterocolitis. The mean age of the mothers was 31 years (SD 5, range from 18 to 44 years). Sixty-five percent of the mothers were married and 79% were married or living in common-law marriage. Sixty-seven percent of the mothers had their first child, 19% had one older child

Table 2 The characteristics of the study infants. The lengths of NICU-related variables were computed only for the infants they apply to

| Characteristic of the infant | N | | Md (Q ₁ , Q ₃) ^a | Min, Max |
|-----------------------------------|-----|---|--|-----------|
| Gestational age (completed weeks) | 210 | | 34 (31, 35) | 24, 37 |
| Birth weight (g) | 210 | | 1940 (1518, 2240) | 520, 2500 |
| NICU-related variables | | Proportion of infants using treatment (%) | Duration | |
| | | | Md (Q ₁ , Q ₃) ^a | Min, Max |
| Ventilator treatment (days) | 39 | 19 | 4 (2, 7) | 1, 60 |
| Supplementary oxygen (days) | 113 | 54 | 3 (1, 16) | 1, 125 |
| Parenteral nutrition (days) | 137 | 65 | 7 (3, 11) | 1, 61 |

^aMd, median; Q₁, lower quartile; Q₃, upper quartile.

and the rest had two or more older children. A total of 73% of the families lived in an urban area. The median distance from the hospital was 16 km (range from 0 to 106 km, Q1 0, Q3 38).

Forty-one percent of the mothers visited every day, whereas 10% of the fathers visited every day ($p < 0.001$). Both parents visited every day in 9% of the families. A total of 34% of the infants had siblings and 92% of them visited the new sibling in the hospital. Eighty percent of the grandparents visited the infant in the hospital, 15% of them visited only once. The visiting frequencies of the parents, siblings and grandparents are shown in Table 3.

Parents

Mothers of the infants hospitalised for > 4 weeks visited less frequently than mothers of infants staying in hospital for ≤ 4 weeks, ($p < 0.001$, Table 4). The length of hospitalisation was strongly correlated with birth weight, gestational age and other medical variables. Therefore, the rest of the analyses were performed separately for the groups hospitalised for ≤ 4 weeks or > 4 weeks.

For the infants hospitalised for ≤ 4 weeks, the only factor affecting the visiting frequency of the mother was the distance from hospital to home (Table 4, footnote). Mothers of infants hospitalised for > 4 weeks visited less frequently if the infant had siblings, needed ventilator treatment or parenteral nutrition or if the distance from hospital to home was longer than 30 km (Table 4). Birth weight, gestational age, life-threatening condition or diagnoses of the infant did not significantly affect the visiting frequency of the mother; neither did the marital status, the age of the mother, the

gender of the infant or hospitalisation > 60 days. There was no difference in the visiting frequency according to the risk classification of the infant (low-risk, low-birth-weight-stable, high-risk. See Table 4, footnote).

The infants staying in hospital for > 60 days had the most actively visiting fathers (median 5.5 visiting days per week, Table 4). Fathers visited less frequently if the family had a long distance from hospital to home or when the infant hospitalised for ≤ 4 weeks had siblings. The visiting frequency of the father was not affected by any other variables mentioned above (Table 4).

The distance from hospital to home and presence of older siblings were correlated and were, therefore, combined (Table 4). A long distance and older siblings together decreased the visiting frequency of both parents if the infant was hospitalised for > 4 weeks.

In the multivariate analyses, separate logistic regression analyses were performed, on the one hand, for the factors affecting the visiting frequency of the mother and the father, and, on the other hand for infants staying in hospital for ≤ 4 weeks or for > 4 weeks. The categorisations of the dependent variables took into account the variability of the variables and gave large enough cell-sizes for calculations. Consequently, for the infants hospitalised for ≤ 4 weeks, the categories for mothers' visiting frequency were 0–6 and 7 days per week and those for fathers 0–5 and 6–7 days per week. For infants hospitalised for > 4 weeks, the categories for both mothers and fathers were 0–5 and 6–7 days per week. In each analysis, the explanatory variables with $p < 0.10$ in the bivariate analysis were included (categorised as shown in Table 4). As a result, for the mothers of infants hospitalised for ≤ 4 weeks, a long distance increased the risk for lower visiting threefold (95% CI 1.3–7.4). For mothers whose infants were hospitalised for > 4 weeks, lower gestational age (OR 6.4, 95% CI 1.5–18.9) and a long distance (OR 16.6, 95% CI 5.1–54.0) were the strongest risk factors for lower visiting frequency. For fathers of infants hospitalised for ≤ 4 weeks, older siblings increased the risk for lower visiting frequency almost fivefold (95% CI 1.3–13.9). For fathers whose infants were hospitalised for > 4 weeks, a long distance (OR 17.8, 95% CI 2.2–145.3) was the strongest risk factor for lower visiting frequency. The infant's hospitalisation over 2 months, however, favoured higher visiting frequency (OR 0.3, 95% CI 0.1–0.9).

Table 3 Visiting frequencies of the parents, the siblings and the grandparents to infants during the NICU period

| Visitor | Visiting days per week | | |
|--------------|------------------------|--|----------|
| | n | Md (Q ₁ , Q ₃) ^a | Min, Max |
| Mother | 209 ^b | 6.7 (6.1, 7.0) | 2.2, 7.0 |
| Father | 209 ^b | 4.8 (3.1, 6.1) | 0, 7.0 |
| Siblings | 71 | 1.3 (0.7, 2.8) | 0, 5.8 |
| Grandparents | 209 ^b | 0.6 (0.2, 1.3) | 0, 7.0 |

^aMd, median; Q₁, lower quartile; Q₃, upper quartile.

^bOne child stayed in the NICU less than one day and had no visits.

Table 4 Factors affecting parents' visits to the neonatal intensive care unit. Only factors with p-values < 0.05 for either of the parents are presented^a. Medians (Md) and quartiles (Q₁, Q₃) are shown

| | Visiting frequency (days/week) | | | |
|--|---------------------------------------|---------|---------------------------------------|---------|
| | Mother | | Father | |
| | Md (Q ₁ , Q ₃) | p | Md (Q ₁ , Q ₃) | p |
| Length of hospital stay | | < 0.001 | | ns |
| ≤ 28 days (n = 116) | 7.0 (6.4, 7.0) | | 5.0 (3.4, 6.4) | |
| > 28 days (n = 93) | 6.4 (5.7, 6.7) | | 4.5 (3.1, 6.0) | |
| Infant hospitalised for ≥ 28 days (n = 93) | | | | |
| Siblings ^b | | 0.022 | | ns |
| Yes (n = 66) | 6.1 (3.6, 6.7) | | 4.0 (1.3, 5.7) | |
| No (n = 27) | 6.4 (6.1, 6.8) | | 4.8 (3.3, 6.1) | |
| Distance from hospital to home ^c | | < 0.001 | | < 0.001 |
| < 30 km (n = 62) | 6.5 (6.2, 6.8) | | 5.3 (3.7, 6.1) | |
| ≥ 30 km (n = 31) | 5.6 (4.4, 6.5) | | 3.3 (1.6, 4.4) | |
| Length of hospital stay | | ns | | 0.039 |
| 28–60 days (n = 70) | 6.8 (6.1, 7.0) | | 4.3 (2.7, 5.6) | |
| > 60 days (n = 23) | 6.3 (5.9, 6.7) | | 5.5 (3.5, 6.3) | |
| Ventilator treatment | | 0.048 | | ns |
| Yes (n = 57) | 6.2 (5.1, 6.7) | | 4.3 (2.7, 6.0) | |
| No (n = 36) | 6.5 (6.1, 6.8) | | 4.6 (3.1, 6.0) | |
| Parenteral nutrition | | 0.041 | | ns |
| Yes (n = 8) | 6.4 (5.6, 6.7) | | 4.5 (3.0, 5.8) | |
| No (n = 85) | 6.8 (6.3, 7.0) | | 5.2 (3.8, 6.5) | |
| Siblings and distance from hospital to home ^d | | < 0.001 | | 0.001 |
| No siblings, distance from hospital to home < 30 km (n = 49) | 6.5 (6.2, 6.8) | | 5.4 (4.2, 6.3) | |
| Siblings, distance from hospital to home < 30 km (n = 13) | 6.5 (6.0, 6.8) | | 5.3 (1.6, 6.0) | |
| No siblings, distance from hospital to home ≥ 30 km (n = 17) | 5.9 (5.1, 6.5) | | 3.5 (1.9, 4.1) | |
| Sibling, distance from hospital to home ≥ 30 km (n = 14) | 4.8 (3.0, 6.2) | | 3.3 (1.2, 4.8) | |

^aOther tested factors were marital status (parents living together/not living together), age of the mother (≤26/>26 years), gestational age (<32/≥32 weeks), gender of the infant, birth weight (<1500 g/≥1500 g), use of supplementary oxygen (yes/no), infant's medical risk classification (low risk: birth weight ≥ 1500 g and no IVH, BPD or NEC/very low birth weight, stable: birth weight ≤ 1500 g no IVH, BPD or NEC/high risk: one of the diagnosis of IVH, BPD or NEC), life-threatening condition (one of the diagnosis of IVH, BPD or NEC, yes/no), bronchopulmonary dysplasia (yes/no).

^{b,c,d}Infants hospitalised for ≤ 28 days.

^bFather 3.5 (2.3, 5.0)/5.4 (4.0, 6.7), p < 0.001.

^cMother 7.0 (6.7, 7.0)/6.5 (5.5, 7.0), p = 0.001; father 5.3 (3.8, 6.6) / 3.5 (2.2, 5.2), p = 0.001.

^dMother 7.0 (6.9, 7.0)/7.0 (6.5, 7.0)/7.0 (5.8, 7.0)/6.0 (4.1, 7.0), p = 0.002; father 5.6 (4.9, 7.0)/4.2 (2.6, 5.3)/3.7 (3.0, 5.4)/2.7 (0.4, 4.3), p < 0.001.

Siblings

According to the bivariate calculations, lower birth weight or lower gestational age of the infant decreased visiting by the siblings. The median visiting frequency was 0.8 visits per week (Q1 0.3, Q3 1.4) if the birth weight of the infant was below 1500 g compared to 1.5 visits per week (Q1 0.8, Q3 3.2) if the birth weight was higher (p = 0.027), and 1.1 visits per week (Q1 0.4, Q3 1.3) if the infant was born before 32 weeks of gestation compared to 1.8 per week (Q1 0.8, Q3 3.3) for more mature infants (p = 0.017). The length of hospital stay, medical condition of the infant, the use of ventilator, supplementary oxygen or parenteral nutrition did not affect the visiting frequency of the siblings. The more often the mother visited the more often the siblings visited (r = 0.43) but the visiting frequency of the father did not correlate with that of the siblings.

Grandparents

Grandparents visited more frequently if the infant was first-born, or if the mother was younger. The median visiting fre-

quency was 0.8 visits per week (Q1 0.3, Q3 1.5) for first-born children compared to 0.4 per week (Q1 0.0, Q3 1.0) for the others (p = 0.001), and 1.0 visit per week (Q1 0.3, Q3 1.6) if the mother was < 26 years of age compared to 0.6 per week (Q1 0.2, Q3 1.1) for the others (p = 0.028). The visiting frequency of the grandparents was not affected by the marital status of the mother, birth weight, gestational age, medical condition or the length of hospital stay of the infant. Visiting frequency of the mother or the father did not correlate with the visiting frequency of the grandparents.

DISCUSSION

In this study population, the mothers and fathers visited the NICU more often than in most studies conducted 15–20 years ago (4,15,18). The factors associated with the parental visiting were mainly similar to those reported in older studies with lower visiting frequency (1,2,14–17). As a new finding, this study reports an association between

gestational age and maternal visits. Our study also describes the visiting patterns of siblings and grandparents.

Overall, the literature suggests that parents' NICU visiting activity is increasing. Despite the differences in reporting the visits, it can be concluded that the visiting frequency was low during the 1970s (3) and started to increase in the 1980s (16) and lately, higher frequencies have been reported (1,2,19). In our hospital, the visiting frequency of the parents increased further during the last decade as this cohort from 1997 to 1998 showed higher visiting frequency compared to our earlier 1989 (5) cohort. In this cohort, 41% of the mothers visited each day compared to 28% in 1989. The proportions of daily visiting fathers were 10% and 2%, respectively.

Our multivariate analysis showed that longer distance between hospital and home was one of the strongest factors associated with lower visiting frequency of both parents, as was also shown by Giacoia et al. (16). Another understandable practical limitation for visiting of the father was the presence of older siblings. In contrast to the previous study (2,15), the visiting frequency of the mothers was not influenced by the presence of children in the family when other factors were entered in the regression analysis. Fathers may be taking more active role in the families including more involvement in childcare. Thus, it is possible that fathers take care of other children at home while mothers visit the hospital. The distance from hospital to home and the presence of older siblings were strongly correlated.

In our study, longer hospital stay of the infant appeared to be a risk factor for lower visiting frequency of the mother. The length of the hospital stay did not decrease the visiting frequency of the father, and contrary to the hypothesis the fathers seemed to visit more if the infants' hospitalisation lasted over 2 months. Franck and Spencer (2) also reported that longer hospital stay decreased the visiting frequency of the parents. One explanatory factor may be that the length of the hospital stay reflects the medical condition of the infant.

The degree of prematurity was strongly correlated with birth weight and other factors reflecting the medical condition of the infant. Investigating the simultaneous factors affecting visiting frequency of the parents, we found that low gestational age, as such, was one of the strongest risk factor for lower visiting frequency of mothers. Reid and her colleagues (1) reported similarly that the mothers of the 'sicker' infants visited less frequently. It has been speculated by Feldman et al. (20) that lower visiting frequency may be explained by mothers' fears about losing the baby or they may have difficulties in bonding with their preterm infants, and this may be seen as avoiding visiting the hospital. The medical condition of the infant did not have a statistically significant effect on the visiting frequency of the father. Previous studies have been contradictory about associations between the infant's medical condition and the visiting frequency of the father. In one study, the infant's medical condition did not affect father's visiting frequency (18), while in another study the fathers of the smaller infants tended to visit the NICU for shorter times than fathers of larger infants (17).

The birth of a premature infant is certainly a stressful time for both parents, but fathers seem to cope with the situation differently compared to mothers. In the study by Miles and her colleagues (11), mothers experienced more stress related to alterations in the expected parental role than fathers; mothers also reported the NICU environment to be more stressful than did fathers. Mothers may also have feelings of guilt for having a preterm infant. Our findings may suggest that the mother-infant relationship might be more vulnerable than the father-infant relationship in preterm infants.

There is a lack of studies related to the visits of siblings in the NICU. In our study, siblings visited less frequently if their new brother or sister was born more prematurely or had lower birth weight. Parents may be more cautious with sibling visits if the infant is very small, and they may be concerned how visiting affects the sibling. However, siblings are part of the family and they have concerns about the new sibling regardless of visiting or not visiting him or her, and the prolonged hospitalisation of the infant may complicate the situation. Siblings may have fantasies about the appearance of the newborn and the related events. According to Schwab and his colleagues (9), visits by siblings seem to enhance children's emotional adjustment to the new sibling and to increase children's participation in the family transition process. Parents may need more information about how NICU visiting may affect their children, and they may also need help in how to explain the medical condition of the premature infant to their other children.

There are no earlier studies exploring the visiting frequency of grandparents in the NICU. It has been suggested that the grandparents may have additional stress as they worry both about their new grandchild and also about their own child as a parent (21). This may be even more pronounced when the mother is young and has still a close relationship to her parents. In our study, visits by grandparents were more frequent when the grandchild was firstborn or the mother was below 26 years of age. Younger mothers also need more support from other people around them. The grandparents have been shown to serve as major sources of support for the mother (12,13).

The limitations of this study include a single centre approach. It would be interesting to evaluate the variation between hospitals within one country. These results, however, are likely to be applicable in other Finnish hospitals, as the visiting policies and patient population are very similar all over the country. Comparisons between countries may bring up larger differences as facilities for the families, visitation policies (6) and distances from home vary. Despite a change in the visiting frequency over the last decades, the factors affecting the visits have changed only little. So, we assume that our results are at least to some extent applicable into hospitals with a similar liberal visiting policy.

In conclusion, our study showed that parents are visiting their infant in a neonatal intensive care unit more actively compared to the past decades. Despite a major change in the visiting frequency, the factors affecting the visits have changed only little. Some changes in those factors, however,

could be identified. Gestational age was found to be a new factor affecting maternal visits suggesting that emotional and relational factors affect the visiting frequency of the mothers. This study is also the first to describe visiting by the wider family in the NICU. To encourage an active participation of the family in the neonatal intensive care of an infant, we need more research about the factors influencing the visits made by the whole family.

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How is maternal recollection of the birth experience related to the behavioral and emotional outcome of preterm infants?

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Abstract

Objectives: To investigate how mother's recollections of birth experiences and first contact with the newborn relate to the child's behavioral and emotional problems at five to six years of age. **Methods:** The study included 28 mothers of preterm (birth weight ≤ 2500 g) and 39 mothers of full-term children, born in Tampere University Hospital in 1998. When the children were five to six years old, maternal recollections of the birth experiences were assessed using the Clinical Interview for Parents of High-Risk Infants (CLIP) and children's behavioral and emotional problems were assessed using the Child Behavior Checklist (CBCL).

Results: Mothers of the preterm children still had more negative recollections of the labor ($p < 0.001$) and first contact with the newborn ($p < 0.001$) than mothers of the full-term children. These recollections related to the child's behavioral and emotional symptoms when the child was five to six years old in the preterm group but not in the full-term group.

Conclusion: The impact of mother's birth experience seems to have long-lasting effects on the preterm child. This finding emphasizes the importance of early physical mother–infant contact and supporting the mothers of preterm infants, especially if they articulate negative or traumatic experiences related to the birth of their child.

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1. Introduction

An increased risk for behavioral and emotional problems during childhood has been frequently reported among preterm children compared to full-term children [1,2]. This

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increased risk has been explained by biological risk factors related to prematurity, but the psychological distress of the parents and separation of the mother from her infant has also been shown to be important [3,4]. Postnatal psychological distress of the mothers of a preterm infant may have an effect on the development of the parent–child interaction [5,6], may increase difficulties in maternal bonding with the infant [7], and may also have long-term effects on the parenting of the preterm child.

It is well known that the birth and hospitalization of a preterm infant is a stressful event for the parents [8,9]. The most common sources of stress during the hospitalization of the infant have been shown to be the alteration in the parental role and appearance of the fragile and sick infant [10,11]. The negative or traumatic birth experience may be one important source of psychological distress for mothers of preterm infants. Among all mothers, 6.8% reported a negative birth experience one year after the event, but negative birth experiences were more common among the mothers of preterm infants [12]. In all mothers, the prevalence of childbirth induced post-traumatic stress disorder has been estimated to be 2.8%–5.6% six weeks after birth [13,14]. The incidence of post-traumatic stress may be even higher among mothers of preterm infants [15,16]. Mother's negative or traumatic birth experiences have been shown to be associated with unexpected medical complications during labor, dissatisfaction with intrapartum care, feelings of lack of control during labor, feelings of intensive pain, and a lack of emotional and social support [12,14]. One important factor associated with the higher prevalence of negative or traumatic birth experience among mothers of preterm infants may also be the unexpected birth of the infant when the mothers are not psychologically prepared to have the infant. There are only few earlier studies on the long-term effect of the negative or traumatic birth experience on the well-being of the mother. In some studies, negative birth experiences or dissatisfaction with the delivery experience have been associated with postnatal depression [17,18].

The influence of mother's negative or traumatic birth experience on the later psychosocial outcome of the children has also been addressed in only few earlier studies. Negative or traumatic experiences of delivery have been associated with eating and sleeping problems in preterm infants [3] and complaints of colic in first-born infants [19]. It has also been shown that psychological distress of the mother has been associated with subsequent emotional and behavioral problems of the child [20,21].

In light of earlier literature it seems to be of critical importance how the mother experiences the birth of her infant. This may have long-term effects on the mother's well-being, on the developing parent–child relationship and on the behavioral and emotional development of the child. The first aim of this study was to investigate the differences in mother's recollections of the birth experience and the first contact with the newborn among mothers of preterm and mothers of full-term infants. The second aim was to investigate how these recollections relate to prematurity and to the visiting frequency of the mother during the hospitalization. The main aim of the study was to investigate how mother's recollections of her birth experience and the first contact with the newborn relate to the children's behavioral and emotional problems at 5 to 6 years of age both in preterm and full-term infants.

2. Methods

2.1. Procedure and participants

All preterm infants (≤ 2500 g and/or < 37 weeks) who were born in the Tampere University Hospital, in Finland in 1998 formed the study population ($n = 144$). Infants who were admitted to the neonatal intensive care unit (NICU) and who stayed there until discharge were included in the study (original sample, $n = 116$). Of the infants who were excluded from the study, 12 were admitted to another hospital before discharge, 10 had died, and six were excluded for other reasons, e.g. being adopted or being of foreign origin or current address being unknown. The control group consisted of the gender-matched full-term infants born directly after each preterm infant. Background information on the preterm infants (e.g. birth weight, gestational age, diagnoses), hospitalization of the infants (e.g. the length of the NICU period, the duration of ventilator treatment, supplementary oxygen and parenteral nutrition), and visiting frequency of the mother (visiting days per week) were retrospectively collected from the hospital records of the infants. All mothers were mailed a set of questionnaires when the child was four to five years of age (this part of the study is not reported here). The first inclusion criterion for the present study was completion of those questionnaires (83 mothers in the preterm group and 65 mothers in the full-term group). This group did not statistically significantly differ from the rest of the original sample either in the preterm or the full-term group, regarding the background variables listed in Table 1. The second inclusion criterion was being singleton born, since parenting of multiples is different from that of singleton borns and the full-term group would not have been comparable in this respect. Therefore, in the preterm group those children who were multiples ($n = 33$) were excluded from the study. In the full-term group an additional inclusion criterion of the child not being hospitalized during his/her lifetime was used (elicited in the questionnaire completed the mothers when the children were 4–5 years of age), leading to the exclusion of five hospitalized children. In addition, those children who had moved away from the Pirkanmaa Hospital District (three in the preterm group and four in the full-term group) and two children in preterm and three in the full-term group for other reasons (e.g. inadequately completed questionnaires or custody away from the biological parents) were excluded from the study. Thus, the final study group consisted of 45 mothers of preterm infants and 53 mothers of full-term infants. In the full-term group, the included mothers and children did not differ statistically significantly from the rest of those who fulfilled the first inclusion criterion. In the preterm group, the excluded children stayed longer in hospital ($p = 0.022$) but were in other respects similar to the included ones. A total of 28 mothers of the preterm children (62%) and 39 mothers of the full-term children (74%) participated in this study. Neither the preterm, nor the full-term participants did differ statistically significantly from the rest of the final study group.

The mothers of the final study group were invited by a letter to a research visit when the child was five to six years of age. If the mother did not respond to the letter, she was contacted by phone. The mothers who agreed to participate were allowed to decide whether the research visit should take place at home (67%) or at the hospital (33%). During the visit the researcher explained the procedure and the mother signed the informed consent form. The visit included an

Table 1 Characteristics of the infants and the mothers

| | Preterm group (n=28) | | | | Full-term group (n=39) | | | |
|---|----------------------|-----------------|--|----------|------------------------|-----------------|--|-----------|
| | % | Md ^a | Q ₁ , Q ₃ ^a | Range | % | Md ^a | Q ₁ , Q ₃ ^a | Range |
| Age of the mother | | 31 | 27, 37 | 23–44 | | 31 | 28, 34 | 20–44 |
| Biological parents living together | 100 | | | | 97 | | | |
| Infant's | | | | | | | | |
| Gender, boy | 50 | | | | 36 | | | |
| First-born child | 50 | | | | 51 | | | |
| Birth weight (g) | | 2055 | 1659, 2308 | 900–2470 | | 3630 | 3270, 3830 | 2680–4590 |
| Gestational age (weeks) | | 33 | 32, 34 | 26–36 | | 40 | 28, 34 | 37–42 |
| Length of hospital stay (days) | | 23 | 18, 28 | 6–109 | | – | – | – |
| Medical risk classification ^b , high | 18 | | | | – | | | |
| Duration of ventilation treatment (days, n=7) | | 2 | 1, 20 | 1–41 | | – | – | – |
| Duration of supplementary oxygen (days, n=21) | | 2 | 1, 5 | 1–103 | | – | – | – |
| Duration of parenteral nutrition (days, n=15) | | 4 | 3, 21 | 2–61 | | – | – | – |

^a Md = median, Q₁ = lower quartile, Q₃ = upper quartile. There were no birth anomalies of the infants in either of the groups.

^b Infant's medical risk classification (low risk: birth weight \geq 1500 g and no IVH, BPD or NEC; high risk: birth weight $<$ 1500 g or one of the diagnosis of IVH, BPD or NEC).

interview with the mother (Clinical Interview for Parents of High-risk Infants; see Measures), two questionnaires completed by the mother (Child Behavior Check List and Edinburgh Postnatal Depression Scale, see Measures) and a structured play session with the child (MacArthur Story Stem Battery; this part of the study will be reported elsewhere). The Pirkanmaa District ethics committee approved the study.

At the time of this study the mean age of the children was 6.2 years (SD 0.4). The mean age of the mothers was 31 years (SD 5). Characteristics of the mothers and the children are shown in Table 1. Only two of the preterm mothers and one full-term mother had an Edinburgh Postnatal Depression Scale (EPDS; see Measures) score over the cutpoint \geq 13. The effect of mother's depressive symptoms on the results could thus be expected to be negligible.

Table 2 Coding system of the CLIP interview

| Main area | Item | Classification |
|---|--|--|
| Child's current condition | Concern about present condition | Yes/no |
| | Development of the child | Proceed in accordance with his/her years/problems in development |
| Course of the pregnancy | First reaction to pregnancy | Positive/negative/ambivalent/neutral |
| | Planned pregnancy | Yes/no |
| | Course of pregnancy | No complications/physical complications/emotional complications |
| | Concern about the child | Yes/no |
| Recollection of the labor and delivery | Recollection of the labor | Positive/negative/ambivalent/neutral |
| | Fear of loss during delivery | No fear/fear for the baby/fear for the baby and the mother herself/fear for the mother herself/unconscious state |
| Relationship with baby and feelings as parent | First contact with the newborn | Positive/negative/ambivalent/neutral |
| | Description of the physical contact with the infant | Yes/no |
| | Recollections of the infancy | Positive/negative/ambivalent/neutral |
| | Parental self image | Secure/insecure |
| Reaction to NICU | Recollection of the NICU period | Positive/negative/ambivalent/neutral |
| | Reaction to the staff | Total/partial/no confidence |
| | Reaction to the NICU setting | Monitors enhance feeling of security/are securing but frightening/are frightening/not mentioned |
| | Feeling that the baby did not belong to the mother | Yes/no |
| | Difficulty to accept participation of many people in the care of the child | Yes/no |
| Support system | Spouse/own parent/other | Full/partial/absent |
| Child's future development | Concern about the child's future | Yes – normal/yes – pronounced/no |
| | Success in starting school | Good/uncertain/does not know |
| | Concern about starting school | Yes/no |

2.2. Measures

2.2.1. Clinical Interview for Parents of High-risk Infants (CLIP, [22])

The CLIP interview was used to assess the mother's recollections of the pregnancy, the delivery, the newborn, and the hospitalization period, likewise her thoughts and feelings about the child during his/her hospitalization. CLIP is a semi-structured interview originally developed for use during the hospitalization period of a preterm infant. We modified the CLIP with the permission of one of the copyright holders (CH Zeanah) to extend the eligibility of the method into later childhood. This required the use of the past tense in some of the questions and the extension of expectations up to the beginning of school (at seven years of age in Finland). Some of the questions were not applicable for full-term infants and were omitted in this group. Mothers were interviewed by one of the authors (RL), and all interviews were audio recorded, transcribed verbatim and coded by the interviewer. Most of the mothers seemed to enjoy discussing their recollections of the pregnancy and birth experience at the interview. There is currently no specific coding system available to analyze the qualitative dimensions of the CLIP interview narrative responses, and therefore we used a more quantitative approach similar to that described by Keren et al. [23] to analyze the mother's narrative content during the interview (Table 2). The analyzed sections (main areas) derived from CLIP were chosen according to our aims. The recollections of the labor and delivery, the relationship with the baby, feelings as a parent and reactions to the NICU were included in the analysis. Fifteen interviews were double-coded by one of the co-authors (RK). The kappa-values of the individual items used in the analyses of this study varied from 0.83–1.00.

2.2.2. Child Behavior Checklist (CBCL, [24])

The CBCL is a standardized and widely used screening questionnaire, which includes items for assessing behavioral and emotional symptoms as well as the social competence of the child (not been analyzed here). Parents can report possible concerns in 118 items and two open-ended ques-

tions. The items are graded as 0 (= not true), 1 (= somewhat or sometimes true) or 2 (= often true or very true). We used the raw sum scores across all items and also internalizing and externalizing sub-scores.

2.2.3. Edinburgh Postnatal Depression Scale (EPDS, [25])

Mothers' depressive symptoms were assessed by the EPDS self-report questionnaire in which mothers are asked to choose from the options the one that best describes her feelings during the previous week. The scale consists of 10 items scored 0–3, and the sum score ranges from 0 to 30. A cutpoint of ≥ 13 was used in this study. The EPDS was originally developed to assess postnatal depression, but has been found to have satisfactory validity even among non-postnatal women [26].

2.3. Data analysis

The background factors of the material are described by frequencies as well as means (*M*) and standard deviations (*SD*) or medians (*Md*) and quartiles (*Q1*, *Q3*), as appropriate. Differences in mother's recollections between the preterm and the full-term groups were examined by cross-tabulations (chi square as the significance test). Associations of the mother's recollections, the CBCL scores and selected explanatory variables were examined pair-wise by Mann–Whitney U-test. The analyses were accomplished with the SPSS package (version 15.0 for Windows).

3. Results

3.1. Differences in mother's recollections of the birth experience and the first contact with the newborn between mothers of preterm and full-term infants

The mothers of preterm children reported more negative recollections of the birth experience than the mothers of full-term children five to six years after the delivery ($p < 0.001$, Fig. 1). The mothers of preterm children described more negative

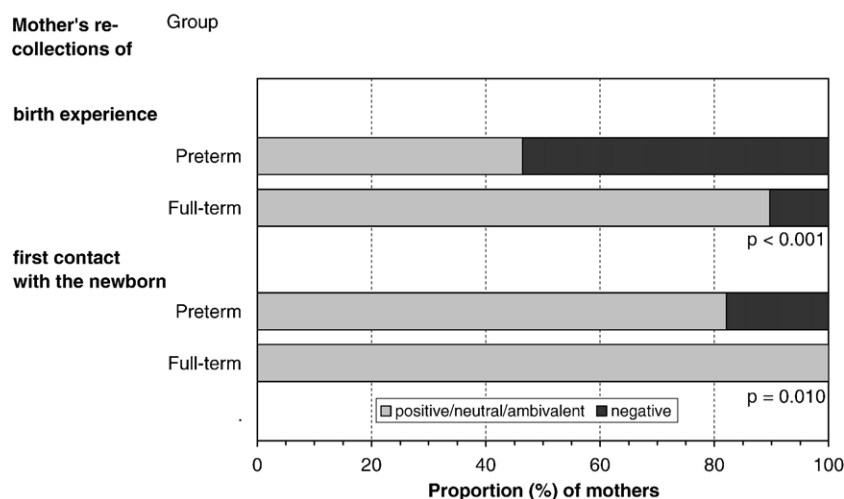


Figure 1 Mother's recollections of the birth experience and the first contact with the newborn in the preterm ($n=28$) and the full-term ($n=39$) groups. Recollections of the birth experience and of the first contact were coded as positive, neutral or ambivalent vs. negative.

experiences during the labor such as feelings of fear, helplessness, anxiety and panic, or they even described their delivery experiences as 'terrible' or 'chaotic'. Also, the structure of these recollections was often incoherent. In addition, repetition, unfinished utterances, speech fillers, disorganized and unfinished thoughts were common among the recollections of the mothers of preterm children. The recollections of some mothers were still highly emotionally evocative after five to six years.

The mothers of preterm children had fewer positive recollections of the first contact with the newborn than the mothers of full-term children ($p=0.010$, Fig. 1). Within the preterm group, the mothers' recollections of the first contact with their newborn were somewhat exiguous and often the mothers only reported that the baby was taken away from them. The recollections of the first contact with the newborn were mainly coherent.

3.2. Association of mother's recollections with the prematurity and the NICU period

In the preterm group, shorter gestational age was associated with more negative maternal recollections of the birth experience (Fig. 2, $p=0.025$). Lower birth weight or the medical risk level of the infant was not statistically significantly associated with the recollections of negative birth experiences. Mothers' recollections of the birth experience were not associated with mothers' visiting frequency in NICU.

Within the preterm group, a shorter gestational age and lower birth weight was associated with negative maternal recollections about the first contact with the newborn (Fig. 2). In addition, there was an association between the medical risk level of the infant and negative maternal recollection about

the first contact with the infant: a total of 9% of the mothers of low risk infants had negative recollections compared to 60% of the mothers of high-risk infants ($p=0.027$). Negative maternal recollections about the first contact with the newborn were associated with a lower visiting frequency of the mother in the NICU (Fig. 2, $p=0.016$).

A total of 36% of the mothers of preterm infants had had a brief physical contact with their infant prior to the admission to NICU. A shorter gestational age and lower birth weight did not explain if this physical contact occurred. There was, however, an indicative association between the infant's medical condition and the existence of a brief physical contact ($p=0.087$). Mother's brief physical contact with her infant did not statistically significantly affect her recollections of the birth experience or her visiting frequency in NICU. A total of 25% of the mothers expressed feelings that the baby did not belong to them, and this was not associated with a shorter gestational age, lower birth weight or medical risk of the infant. Feelings of the baby not belonging to the mother did not affect mother's visiting frequency in NICU.

Most of the mothers had ambivalent (61%) or positive (25%) overall recollections of the NICU period, while only 7% ($n=2$) of the mothers had negative recollections. All mothers reported total or partial confidence in the NICU staff. A total of 36% of the mothers of preterm children reported that the monitors were reassuring but frightening, 14% thought that the monitors were just frightening and the rest did not mention monitors.

3.3. Associations between maternal recollections and child's behavioral and emotional problems

Preterm children had more total and externalizing symptoms than full-term children according to the CBCL completed by

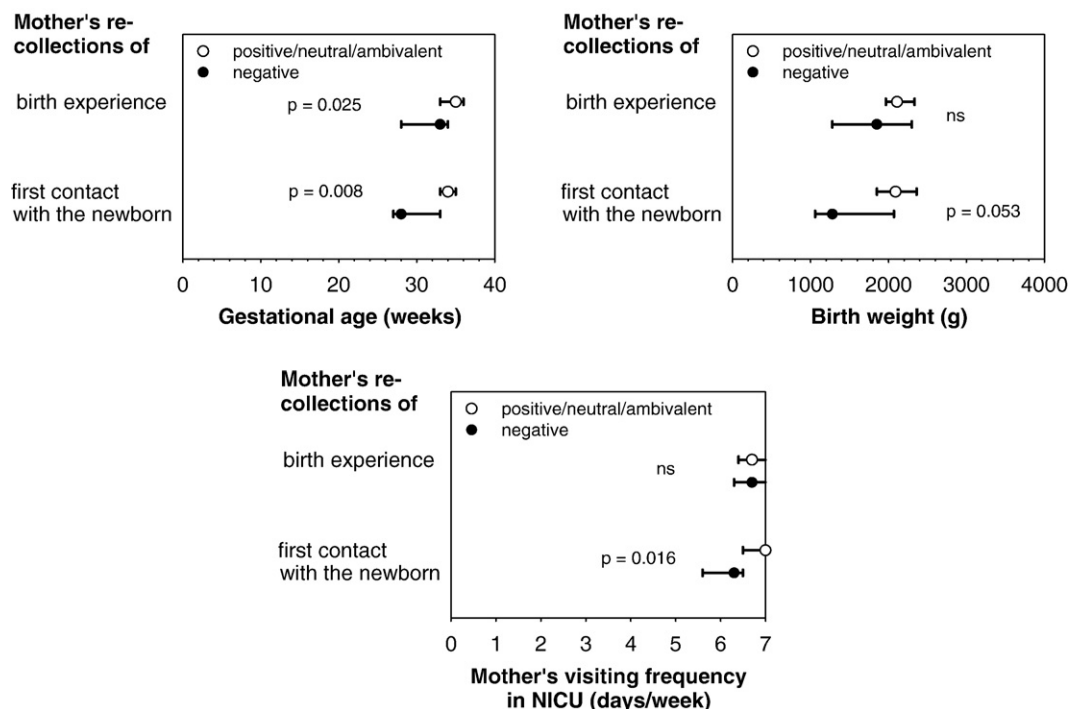


Figure 2 Median and quartiles of the gestational age and birth weight of the preterm infants, and maternal visiting frequency with either positive or negative maternal recollections.

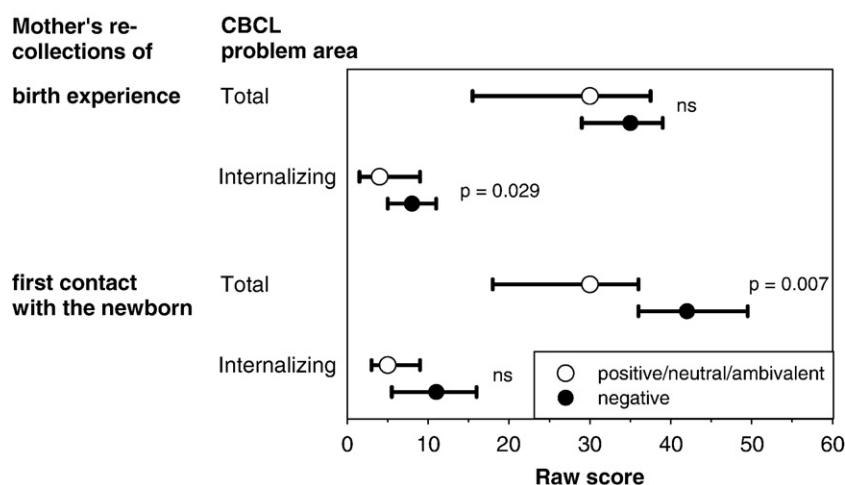


Figure 3 Median and quartiles of behavioral and emotional problems in the preterm group, according to mother's recollections of the birth experience and the first contact with the newborn. Recollections of the birth experience were coded as positive, neutral or ambivalent ($n=13$) vs. negative ($n=15$) and recollections of the first contact as positive, neutral or ambivalent ($n=23$) vs. negative ($n=5$). Externalizing symptoms did not differ significantly in either case.

the mother: the median total raw score was 22 (Q1 13, Q3 29) in the full-term children and 33 (Q1 22, Q3 39) in the preterm children ($p=0.006$); the respective values for externalizing symptoms were 8 (Q1 5, Q3 13) and 12 (Q1 7, Q3 16; $p=0.048$). Internalizing symptoms showed no statistically significant difference between the groups.

In the preterm group, mother's negative recollections of both the birth experience and the first contact with the newborn were associated with the child's CBCL raw scores at five to six years of age (Fig. 3). CBCL raw scores were not associated with the birth weight, gestational age or medical risk of the preterm infants. There were more internalizing symptoms in the preterm children whose mothers had negative recollections of the birth experience ($p=0.029$, Fig. 3). Mother's negative recollections of the first contact with the newborn were also associated with higher CBCL total raw scores ($p=0.007$, Fig. 3) and, to some extent, with internalizing raw scores ($p=0.094$). The recollections of the first contact with the infant were not associated with CBCL externalizing raw scores.

In the preterm group, the lack of a physical contact was associated with child's behavioral and emotional problems at 5–6 years of age. When the mother had had a brief physical contact with her infant right after birth, the median CBCL total raw score was 24 (Q1 17, Q3 32) as compared to 35 (Q1 29, Q3 41) for the rest of the mothers ($p=0.024$). Mothers' expressed feelings that the baby did not belong to them were not associated with subsequent behavioral and emotional symptoms of the child.

In children born full term, the CBCL scores were not associated with the mother's negative recollections of the birth experience and the first contact with the newborn.

4. Discussion

This study shows that the mothers' recollections of birth experience were still more negative five to six years later if the child had been born prematurely. The negative recollections were associated with the children's subsequent behavioral and emotional problems in preterm but not in full-term infants.

The long-lasting negative recollections of the birth experience and their effects on the children's emotional and behavior symptoms in the preterm group might reflect the overall vulnerability of the preterm children and their mothers. In a preterm delivery, the mother is psychologically unprepared to give birth to a baby. In addition, there are many other major sources of stress during and after the birth of a preterm infant such as concern about the infant's survival and health and separation from the infant [10,11]. Therefore, multiple stressors accumulating in the preterm group may offer an explanation to the persistence of mother's negative birth experience and its effect on parenting and child behavior. On the other hand, the infant him/herself might, due to the prematurity, be more vulnerable to the effects of the parenting stress than mature full-term infants.

Although there are studies showing more negative or traumatic birth experiences among mothers of preterm infants [12,15], it has not been ascertained how long these negative memories may last. Kersting et al. [15] showed that post-traumatic symptoms were still more common in a preterm group than in full-term group 14 months after delivery. In an unselected group, negative birth experiences have been shown to extend up to the second year after delivery [27,28]. According to our findings, the memory of birth experiences may remain negative for several years after a preterm delivery and for some women the memories are still emotionally evocative a long time after the birth of the infant. One explanation for a long-lasting traumatic stress after a preterm delivery could be that the birth of a preterm infant is a complex traumatic event as speculated by Kersting et al. [15]. Mother's concerns about her child's health and development may persist for months, and mothers are confronted every day with this continuing traumatizing reality while caring their preterm child. This may affect parenting and the development of the child, thus explaining the association between behavioral symptoms and mother's negative memories. Burger et al. [29] found that a psychological trauma related to a complicated pregnancy and to a preterm birth may have a long-term influence on the mother's

concerns about her child and on the way she perceives her child.

The effects of the birth experience on later child behavior may be mediated through mother–infant interaction. Muller-Nix et al. [5] have shown that postnatal psychological distress of mothers of preterm infants had an effect on mother–child interaction when the child was six months of age. The vulnerability of preterm born children may also predispose these children to subtle changes in interaction behavior [30,31]. On the other hand, the effect of the birth experience may be mediated through postnatal depression of the mother as the maternal psychological stress has been shown to be associated with the depressive symptoms of the mothers of preterm infants [32,33]. Maternal postnatal depression itself may also be associated with adverse outcome of the child [34].

In our study, one third of the preterm group mothers had a brief physical contact with their infant before the infant's admission to the NICU. The early physical contact of the mother and the infant has been emphasized as an important element in the bonding process [35]. In our study, those children who had a brief physical contact with their mother had fewer subsequent behavioral and emotional symptoms supporting the importance of the first contact between the mother and the infant. Redshaw [36] also emphasized the importance of the first contact in the bonding process. He found that two months after discharge from NICU mothers who had not had physical contact with their preterm infant during the first 24 h after the birth of the infant were more likely to feel that their baby did not yet belong to them or only started to belong to them just recently.

Interestingly, the negatively experienced first contact with the infant was associated with fewer visits in the NICU by the mother. The negative experience of the first contact with the newborn may cause difficulties in the bonding process, and cause the mother feelings of insecurity, disappointment and fear resulting in unwillingness to visit her infant in the NICU. Low visiting frequency in the NICU may also have long-term effects on the development of the mother–child relationship and which may have an influence on the difficulties in the development on preterm children. As shown earlier by our group [37], low visiting frequency was associated with subsequent behavioral problems of the child. This finding provides new information suggesting that there are underlying factors affecting the visiting frequency, which serves as an indicator for preterm children's subsequent behavioral and emotional problems.

As we evaluated mother's birth experiences retrospectively, the current situation of the mother or the child may have affected the memories. In this study mother's current depressive symptoms did not affect the memories because there were only three out of 68 possibly depressive mothers in the study group. An alternative explanation for our finding could be a recall bias due to concurrent behavioral problems of the child. In this case, however, it would be likely that the association would also be found in the full-term group. However, no such association was found in that. Evaluating mother's birth experience retrospectively provides us the advantage of getting a more enduring view of the birth experience, which is – in long term – more relevant concerning the parenting of the preterm child. However, a longitudinal approach would give us even a better picture of

the evolution of the negative experiences between the mother and the child.

The small sample size of our study was due to a laborious method requiring home visits. We think that our small study group is representative as this group did not differ significantly from the original sample regarding the background information. Although the study group was heterogeneous concerning the degree of prematurity, we do not see this as a limitation as we were interested in the birth experience of the mother unrelated to the gestational age.

In light of our study, the CLIP interview seems to be a good tool to identify mothers needing support as it provides extensive information about mother's subjective experience of the pregnancy and the birth of the infant and thus identifies a risk group for later problems. Our findings also emphasize the importance of early physical contact between the mother and her preterm infant right after birth of the infant. Although the early physical contact is not always possible because of the initial treatment procedures of a critically ill preterm infant, the importance of this should be recognized, and whenever even the brief early physical contact between mother and infant is possible, it should be arranged. Mothers' physical contact with their infants during the neonatal intensive care have been shown to improve the quality of mother–infant interaction [38,39], so if it is not possible to arrange early physical contact between mother and infant, it is nevertheless important to motivate parents to have physical contact with their infant during the hospitalization.

In conclusion, the birth experience seems to have long-lasting effects on the well-being of both the mother and the child. This finding emphasizes the importance of early physical mother–infant contact and supporting the mothers of preterm infants, especially if they report negative or traumatic experiences related to the birth of their child.

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