

## SUMMARY

Each year in the Netherlands approximately 8% of all births are very preterm. Very preterm birth has consequences for both the child and the parents. Preterm infants are at increased risk for neurodevelopmental impairments in childhood as a result of neonatal brain injury as well as interruption of the normal process of brain maturation that occurs during the last trimester of pregnancy. Next to and often due to medical complications, preterm infants experience difficulties in their self-regulation, referring to the ability to modulate emotion, self-soothe, delay gratification, and tolerate change in the environment. This affects their ability to explore and interact with their environment and consequently their learning processes.

For parents preterm birth interrupts the normal process of adjustment to parenthood, not only because of the unexpected nature of the birth, but also because of the infant's fragile medical condition and extended hospitalization. Coping with preterm birth can be a difficult and distressing experience for parents and it may lead to post-traumatic stress symptoms. Preterm birth can also complicate the development of a healthy mother-infant relationship. Both the NICU surrounding, in which the physical closeness and caretaking between mother and child is complicated, and the emotional imbalance of the mother may prevent the mother from bonding with her child. Also the mother-infant interaction after preterm birth may be more difficult because of the unclear behavioral signs of the baby, as well as the emotional state of the mother influencing her possibilities to interact sensitively with her baby.

Considering the fact that developmental, social-emotional and health problems of very preterm infants persist even into early adulthood, various types of early intervention programs have aimed to improve the long-term outcome of these children. Up until now only some long term positive effects are found on cognitive developmental outcome by a few post-discharge intervention programs. However, rarely effects of such intervention programs on feelings and functioning of the parents were studied.

In this thesis, the effects of the Infant Behavioral Assessment and Intervention Program (IBAIP) were evaluated. IBAIP is a post-discharge preventive intervention program and aims at early self-regulatory support, as one of the basic elements underlying the infant's development and parent-infant relationship and interaction. **(Chapter 1)**

The results of IBAIP were studied using a randomized controlled trial in a sample of very preterm born infants and their parents. Attention was paid to mother-infant interaction,

maternal psychological well-being, maternal parenting stress and maternal attachment representations.

In **Chapter 2** the effect of the IBAIP on the mother-infant interaction is described. Mother-infant interaction was assessed with the Still-face procedure in which 112 mother-infant dyads participated, 57 from the intervention group and 55 from the control group. The Still-face procedure consists of three episodes. In the first 2-minute episode the mother is instructed to interact with her child as she normally does in the home situation. The second 2-minute episode is the Still-face episode in which the mother is not allowed to interact with her child and to keep a blank face. During the third episode the mother is allowed to interact again with her child. Micro-analytic coding was done on a second by second basis using the Infant and Caregiver Engagement Phases system. The Maternal Sensitivity and Responsivity Scales were used to assess the overall quality of the mother infant interaction.

Hypothesized was that IBAIP would increase positive and sensitive maternal behavior and improve self-regulated infant behavior during mother-infant interaction. Results showed that mothers who received IBAIP were more sensitive in interaction and less overcontrolling towards their infant during the Still-face procedure. Moreover, they showed somewhat more positive behavior during the first interaction episode, which reflects improved baseline interactive behavior. Better regulated infant interaction behavior and less stress behavior was not seen in the intervention infants during the Still-face procedure. We conclude that IBAIP may have led to subtle changes in mother-infant interaction, which are important in view of the developmental improvement of the intervention infants. Small and subtle changes can accumulate and lead to large developmental differences. Further study on the effect of IBAIP on mother-infant interaction should be done to evaluate what part of the intervention procedure may affect improvements in maternal sensitivity that may contribute to the developmentally enhancing effect of IBAIP for preterm infants.

**Chapter 3** describes the effect of the IBAIP and very preterm delivery on maternal psychological distress at 6, 12 and 24 months of the infant's corrected age. It was hypothesized that the IBAIP might decrease maternal psychological distress as a result of the support in the home situation provided by professionally trained IBAIP interventionists. Maternal psychological distress was studied using the General Health Questionnaire 28 (GHQ) (Goldberg et al., 1988). At 6 months 125 mothers of preterm babies (64 intervention vs. 61 control) answered the GHQ. Maternal response rates were 86%, 76% and 62% at 6, 12 and 24 months, respectively. No differences in maternal psychological well being

were found between mothers of infants who received IBAIP after discharge from the Neonatal Intensive Care Unit, compared those who did not. In general, all mothers reported much psychological stress at 6 months after term date, as more than half (56%) of the mothers then scored above the clinical cut-off level. Because of the high amount of mothers with clinically relevant psychological distress symptoms at 6 months corrected age of their children in both the intervention and control group mothers, we compared our results with mothers of term infants. The significantly higher rate of clinical cases (35%) in the group mothers of very preterm infants showed that mothering a term infant, is not as distressing as mothering a very preterm infant. However, two years after birth the psychological stress levels in both the intervention and control group mothers of preterm infants have normalized compared to norm reference women. More focused intervention for the mother is warranted during the first 6 months after preterm delivery.

**Chapter 4** focuses on the effect of the IBAIP on maternal parenting stress 12 and 24 months after preterm delivery. It was hypothesized that the IBAIP might decrease maternal parenting stress as a result of the support at home by the professional interventionists. Maternal parenting stress was assessed with the Dutch version of the Parenting Stress Index (NOSI). At 12 months 123 mothers completed the NOSI (response rate 79%) and at 24 months 103 mothers completed the NOSI (response rate 67%). Mothers who received IBAIP assessed their children at 24 months corrected age as happier and less hyperactive/distractible than the control mothers. However, the intervention group mothers reported at the same time more feelings of social isolation. More information from the parents is needed to detect the aspects of the IBAIP which may have contributed to these feelings of social isolation. The IBAIP interventionist should become aware of this possible consequence of the intervention. No differences in maternal parenting stress between the intervention and control group were found at 12 months. Weak to moderate correlations were found between maternal parenting stress and maternal psychological distress at 12 and 24 months. Parenting a very preterm infant, even a very high risk infant, was not found to lead to extreme levels of parenting stress 1-2 years after birth.

In **Chapter 5** the effect of the IBAIP on maternal attachment representations is studied. It was hypothesized that IBAIP support might have a positive impact on the mother-child relationship, reflected in the maternal attachment representations regarding her child and her relationship with her child. Maternal attachment representations were assessed with the Working Model of the Child Interview. This interview is designed to elicit parents'

feelings about their relationships with their children. It was also used in order to allow mothers to express themselves in their own words and to emphasize, what they remembered as important feelings and experiences. Next to the resulting attachment classifications, conventional content analysis was used to gain a richer understanding of maternal emotions and experiences after very preterm delivery.

Seventy-eight mother-infant dyads participated in the interview. No differences were found in the quality of maternal representations of the attachment relationship with their child in the intervention and control group mothers. In both groups about 70% of the mothers had a balanced attachment representation and 30% had a nonbalanced attachment representation of their relationship with their infant.

Content analyses showed that 50% of the mothers felt negative emotional responses to their infant when they first saw their baby. These negative emotions consisted of feelings of anxiety and alienation. The first few weeks at home with the child after discharge were described as stressful, worrisome and anxious by 39% of the mothers. Negative emotions during these first moments with their baby were related to a nonbalanced maternal attachment representation. Therefore, it seems very important to support mothers both early during their infants' stay in the hospital, as well as later at home after hospital discharge, to build a healthy attachment relationship.

In **Chapter 6** the results of the study are discussed, followed by a critical review of the strengths and limitations of the study, the clinical implications and considerations for future research. It is concluded that the IBAIP led to more sensitive mother-infant interaction at 6 months after term date and to some decreases in maternal parenting stress at 24 months after term date. However, the IBAIP in its current form did not prevent high levels of maternal psychological distress during the first year after birth and may have caused feelings of isolation two years after term date. Further study is necessary to detect which specific aspects of the IBAIP are responsible for these results.

Implementation of the IBAIP is justified, but the current intervention program needs to be extended with specific maternal support to prevent clinical levels of psychological distress and to promote a secure mother-infant bonding.