The Infant Behavioral Assessment and Intervention Program for Very Low Birth Weight Infants at 6 Months Corrected Age

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Objective To determine whether the Infant Behavioral Assessment and Intervention Program (IBAIP), designed to support and enhance infants' self-regulatory competence, improved developmental and neurobehavioral outcomes in very low birth weight (VLBW) infants.

Study design We randomized 86 infants to 1 intervention before discharge and to 6 to 8 home interventions until 6 months corrected age, and 90 control infants received standard care. Developmental and behavioral outcomes were evaluated at 6 months corrected age with the Bayley Scales of Infant Development-II (BSID-II). Neurobehavioral functioning was evaluated with the Infant Behavioral Assessment (IBA) at baseline and at 6 months corrected age.

Results Despite randomization, some differences in neonatal characteristics were found between the intervention and control infants. After adjustment, intervention effects of 7.2 points (± standard error 3.1) on the Mental Developmental Index and 6.4 ± 2.4 points on the Psychomotor Developmental Index favored the intervention infants. The Behavioral Rating Scale of the BSID-II ($P = .000$) and the IBA (more approach [$P = .003$] and less stress [$P = .001$] over time) also favored the intervention infants.

Conclusions The IBAIP improved the mental, motor, and behavioral outcomes of VLBW infants at 6 months corrected age.
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Although the number of survivors of neonatal intensive care is increasing, very low birth weight (VLBW) infants continue to have more behavioral, cognitive, motor coordination, and visuomotor difficulties at school age and in adolescence compared with term-born peers.[1,2] These late neurodevelopmental impairments of preterm infants may be apparent as self-regulatory problems in early infancy, including an unstable physiological base, poor quality of movements and a lack of postural control, less robust state, and underreactivity or overreactivity to sensory information.[3-5] Problems with self-regulation decrease an infant's social interactive and exploratory opportunities, which are necessary for learning,[6-8] and increase stress and coping behaviors,[9] which may alter the architecture of the rapidly developing brain.[6-8] Because early caregiving conditions and socioeconomic factors mediate infants' self-regulatory competence,[8,10,11] parents of preterm infants may need preventive support.[12,13]

Despite the heterogeneity in outcomes and content of early intervention programs for preterm infants,[14-16] a recent meta-analysis demonstrated that these programs improve cognitive development in the short to medium term and suggested that programs that focus on parent–infant relationships along with infant development may have the greatest impact.[17] Few intervention studies have addressed infants' self-regulatory competence during early interactions or have reported changes in the quality of neurobehavioral performance over time, however. Consequently, we investigated, in 2 pilot studies,[9,18] the Infant Behavioral Assessment (IBA)[19] and the corresponding Infant Behavioral Assessment and Intervention Program (IBAIP),[20] which are designed to support and enhance

BRS	Behavioral Rating Scale	MDI	Mental Developmental Index
BSID-II	Bayley Scales of Infant Development	NIDCAP	Newborn Individualized Developmental Care and Assessment Program
GA	Gestational age	PDI	Psychomotor Developmental Index
IBA	Infant Behavioral Assessment	VLBW	Very low birth weight
IBAIP	Infant Behavioral Assessment and Intervention Program		

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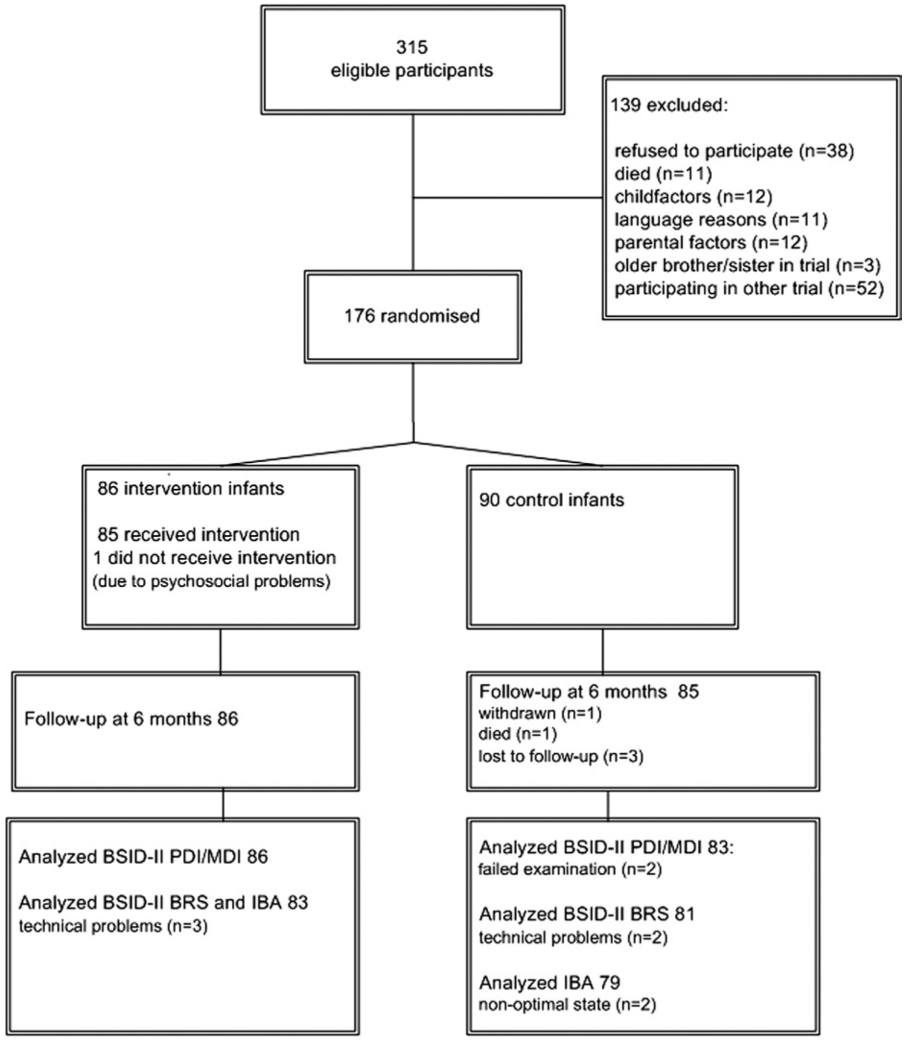

Figure. Patient flow and follow-up.

infants' self-regulatory competence. We found that the IBA was a valuable instrument in discriminating differences in self-regulation, and that the IBAIP improved scores on the Bayley Scales of Infant Development (BSID-II).[18] The current randomized controlled trial was performed to evaluate whether the IBAIP improves motor, mental, and behavioral outcomes and regulatory competence of VLBW infants at 6 months corrected age.

METHODS

A randomized controlled trial was carried out in Amsterdam, the Netherlands. Two level-III hospitals with neonatal intensive care unit facilities and all 5 city hospitals participated. The Medical Ethics Committees of all hospitals involved approved the study design. All infants of gestational age (GA) $<$ 32 weeks and/or birth weight $<$1500 g whose parents lived in Amsterdam were eligible for the study. Infants with severe congenital abnormalities, those born of mothers with a documented history of illicit drug use or severe physical or mental illness, those from non-Dutch speaking families for whom an interpreter could not be arranged, and those participating in another trial on postdischarge management were excluded.

The parents were given verbal and written information when their infant was 32 to 34 weeks GA (Figure). In a second meeting, parents who decided to participate in the study signed informed consent. Baseline assessments and interventions were carried out by 6 experienced pediatric physical therapists specially trained in the IBAIP. Because the interventions were administered by the same person who performed the baseline assessment, randomization was done after a baseline video recording of the infant's neurobehavioral performance at 35 to 38 weeks postmenstrual age. Randomization into the control or intervention group was computer-generated, stratified for GA ($<$ 30 weeks and $\geq$ 30 weeks) and recruitment site, with twins assigned to the same group. The infants and parents in the intervention group received 1 IBAIP session shortly before discharge and 6 to 8 home interventions up to when the infant reached 6 months corrected age. The control infants received standard care. Regular outpatient visits to the pediatrician were standard in both the intervention and control groups. The local pediatricians were free to refer any infant for physical therapy if necessary; however, control infants were not allowed to be referred to an IBAIP-trained pediatric physical therapist, and intervention infants were allowed to receive a maximum of 3 extra home visits by their own IBAIP-trained physical therapist.

Instruments

All 3 subscales of the Dutch version of the BSID-II were used to assess mental, motor, and behavioral outcomes.[21] The Behavioral Rating Scale (BRS) reports the examiner's observation of behavior during administration of the BSID-II. The "orientation/engagement and emotional regulation" factors reflect information processing and emotional coping behavior during a task and in a social setting. The "motor quality" factor indicates performance in various neuromotor functions, including muscle tone, posture, fine and gross motor movements, and frenetic movements.

Neurobehavioral competence was assessed using the IBA.[19] This observation instrument for infants from term age through age 6 to 8 months, based on the same theory as the Newborn Individualized Developmental Care and Assessment Program (NIDCAP),[22] discriminates 113 well-defined behaviors in the autonomic, motor state, and attention/interaction subsystem of neurobehavioral functioning and interprets them as behaviors to approach information, stress behaviors, or behaviors to self-regulate during the interaction. Self-regulatory behaviors have a multi-interpretable character; they may be used to concentrate, cope, or console. For this study, the communicative behaviors of approach, self-regulation, and stress were registered and counted for data analysis. The mean for each category was calculated. The degree of self-regulatory competence depends on the effectiveness of the infant's self-regulatory behaviors. When regulatory behaviors are accompanied by a greater amount of approach behaviors, the infant's self-regulatory competency is considered more optimal; when regulatory behaviors are accompanied by a higher amount of stress behaviors, self-regulatory competency is considered less optimal.

No norms for regulatory competence are available. Interrater reliability was established during IBA training certification, with at least a 90% item-by-item agreement achieved. Data on the validity of the IBA are limited. The IBA was found to discriminate differences in self-regulation between term and preterm infants and to identify behavioral changes over time.[9,18] In the same studies, acceptable internal consistencies of $\alpha = 0.75$ for approach and stress and $\alpha = 0.60$ for regulation were found (data not shown).

The neurologic examination, conducted as described by Touwen,[23] was used to assess neurologic function at 6 months corrected age. Abnormal development was defined as severe abnormality of tone, posture, and movement leading to impairment and/or delay in motor development. Mildly abnormal development was defined as moderate abnormality of tone, posture, and movement leading to a minor impairment or developmental delay.

Assessment Procedure

Perinatal variables were abstracted from the medical records. GA was determined based on maternal history and ultrasound examination in early pregnancy and confirmed postnatally by the Dubowitz score if antepartal information was inconclusive.[24] Cerebral hemorrhage was defined according to Papile,[25] periventricular leukomalacia according to de Vries.[26] For baseline regulatory competence at 35 to 38 weeks GA, the infant's neurobehavioral functioning during a parent–infant caregiving interaction was recorded on video, out of which a 2-minute "observation window" during diaper changing was used to score the IBA. Socioeconomic data were obtained from a parent questionnaire. At 6 months corrected age, developmental (BSID-II) and neurologic assessment was conducted at the follow-up clinic of the Academic Medical Center by independent specialized examiners blinded for group assignment (D.M., L.vS., and A.vW.). Parents and interventionists were aware of the group assignment and were instructed to not inform any of the outcome assessors. The BSID-II assessment was recorded on video to enable another blinded investigator to score the IBA and the BRS. A 2-minute observation window during the "exploration of the bell" was used to score the IBA.

Outcome Measures

Primary outcome measures were the Mental Developmental Index (MDI) and Psychomotor Developmental Index (PDI) of the BSID-II. Secondary outcomes were the IBA, BRS, and neurologic outcome measures.

Intervention

The intervention aims to enhance the infant's social and environmental interactions without causing distress, which reinforces the infant's motivation and autonomy to explore and to learn from the information. The IBAIP builds on both the infant's and parent's strengths, seeking opportunities instead of problems in behavior, enhancing mutually satisfying interaction and parental empowerment. The intervention program is based on repetitive observations of the infant's behavior and the setting during interaction, using the IBA. The interventionist uses the IBA to sensitize parents to the way in which their infant handles environmental information and assists parents, embedded in everyday life, to adjust the environment to their infant's neurobehavioral needs and to offer co-regulatory support during their infant's interactions. These co-regulatory strategies focus on midline orientation (eg, bringing hands together and hands to mouth) and are also used to enhance postural control (eg, head and body righting in different positions) with the aim of addressing specific motor problems in preterm infants. Each home visit lasts approximately 1 hour.

After each intervention session, the parents receive a report, illustrated with pictures of their infant. This report describes the infant's neurobehavioral and developmental progress and gives suggestions on how to support the infant's explorations and self-regulatory competence. As the infant matures and his or her neurobehavioral functioning increasingly stabilizes, the parents are encouraged to gradually reduce their co-regulatory support and to enjoy their infant's growing independency.

Power Calculations and Statistical Analysis

We considered a difference between the intervention and control groups of 0.5 SD in BSID-II (PDI and/or MDI) as effective, at 6 months corrected age. Therefore, a sample size of 180 patients (90 in each group) would provide 90% power to detect a significant difference between the 2 groups at 6 months with an α level of 0.05, allowing for a dropout rate of about 6%.

Data were analyzed using SPSS 14.0 (SPSS Inc, Chicago, Illinois). Independent-sample *t* tests, Mann-Whitney *U* tests (2-sided), and χ^2 tests were performed to compare the 2 groups. Multivariate linear regression analyses were performed to assess the effect of intervention on the BSID-II, adjusting for neonatal characteristics. Sex, weeks of gestation, cranial ultrasound abnormalities, and oxygen therapy for ≥ 28 days were entered as fixed factors, because their potential negative influence on development has been described in the literature. Factors associated with the primary outcomes, differing significantly between the intervention and control group (use of indomethacin and septic episodes), were entered stepwise in the model (Table I; available at www.jpeds.com). An α level of 0.05 was used for all tests of significance. All analyses were based on intention to treat. The trial is registered with controlled-trials.com (ISRCTN65503576).

RESULTS

Recruitment took place between January 2004 and April 2006. A total of 315 infants were eligible for the study (Figure). Ultimately 176 infants and their parents participated; 86 were assigned to the intervention group, and 90 were assigned to the control group. NIDCAP formed no standard part of the care, although a limited number of very ill infants received NIDCAP care, equally divided between the intervention (n = 4) and control groups (n = 4). All except 1 of the 86 intervention infants received the planned intervention (81 infants received 8 sessions, and 4 infants received 6 or 7 sessions); 1 infant did not receive intervention due to the mother's severe psychosocial problems. According to the intention-to-treat principle, this infant was included in the intervention group in the analyses. In 6 cases, the infant's long hospital stay caused a late start of the home intervention, ranging between 4 and 8 weeks after term age. In 4 cases, the IBAIP-trained pediatric physical therapist administered the first interventions in hospital. In the other 2 cases, more frequent sessions were provided after discharge. Extra intervention (1 to 3 sessions) was given on the pediatrician's request in 4 intervention infants (due to problems with tone regulation in 3 and extreme crying/parental stress in 1). A total of 25 control infants (29%) were referred for pediatric physical therapy, most often because of problems in tone regulation.

All 86 intervention infants were assessed at 6 months corrected age. In the control group, 3 infants were lost to follow-up, the parents of 1 infant withdrew, 1 infant died before discharge, and 2 examinations failed, leaving 86 intervention infants and 83 out of 90 control infants to analyze for the primary outcomes. Because of technical problems with the video administration or a nonoptimal state of the infant, 83 intervention infants and 81 control infants were available for analysis with the BRS, and 83 intervention and 79 control infants were available for analysis with the IBA.

Parent and Infant Characteristics

Socioeconomic factors were well balanced (Table II; available at www.jpeds.com). The infant's parents were from various ethnic backgrounds; about half of them were born in the Netherlands. Despite randomization, more infants in the intervention group than in the control group were < 28 weeks GA (21 vs 11; *P* = .04). In addition, the infants in the intervention group had more septic episodes and were oxygen-dependent for longer periods.

Primary Outcomes: Developmental

The intervention group performed better on both the MDI and the PDI. The mean (± standard deviation [SD]) MDI scores were 105 ± 20 for the intervention group and 100 ± 20 for the control group (*P* = .2), and the mean PDI scores were 97 ± 16 and 94 ± 16, respectively (*P* = .2). The effects of the factors that independently influenced the primary outcomes are summarized in Table I. The adjusted mean (± standard error [SE]) MDI scores were 106 ± 2.12 for the intervention group and 99 ± 2.18 for the control group (*P* = .02), and the adjusted mean PDI scores were 98 ± 1.63 and 92 ± 1.66, respectively (*P* = .008). No significant interaction was found between treatment and GA < and ≥ 28 weeks, cranial ultrasound abnormalities, or socioeconomic factors. Because 30% of our sample was part of a twin or triplet set, all analyses also were performed with only 1 child per family; this did not change the results.

Secondary Outcomes: Neurobehavioral and Neurologic

The BRS also favored the intervention infants (Table I). The mean (± SD) total scores were 52.5 ± 31.3 for the intervention group and 39 ± 27.3 for the control group (*P* = .004); the adjusted means (± SE) were 55.2 ± 3.16 and 36.3 ± 3.2, respectively (*P* = .001). The mean (± SD) scores on the orientation and emotional regulation scale were 44.4 ± 23.4 in the intervention group and 35.7 ± 21.6 in the control group (*P* = .014; adjusted mean, *P* = .000). The mean (± SD) scores for

Table III. IBA data

Outcomes at baseline (GA 35 to 38 weeks) and 6 months corrected age

Outcome	GA 35 to 38 weeks			6 months		
	Intervention (n = 85)	Control (n = 84)	P	Intervention (n = 83)	Control (n = 79)	P
IBA sum scores						
IBA total approach, mean (SD)	3.1 (1.7)	3.9 (1.8)	.01	14.9 (2.5)	14.2 (2.4)	.1
IBA total regulation, mean (SD)	12.5 (3.0)	12.7 (3.1)	.7	13.8 (2.5)	14.2 (2.4)	.2
IBA total stress, mean (SD)	12.6 (3.1)	11.4 (2.6)	.01	1.5 (2.0)	2.0 (2.3)	.1

Change scores between 0 and 6 months corrected age

Outcome	Intervention (n = 83)	Control (n = 74)	Δ (95%)	P
IBA sum scores				
IBA total approach (SD)	11.7 (2.9)	10.2 (2.8)	1.5 (0.6 to 2.4)	.001
IBA total regulation (SD)	1.3 (3.7)	1.4 (4.1)	−0.1 (−1.3 to 1.1)	.8
IBA total stress (SD)	−11.1 (3.8)	−9.4 (3.1)	−1.7 (−2.80 to −0.6)	.003

Independent-sample *t* test.

motor quality were 32.6 ± 35 in the intervention group and 16.7 ± 18 in the control group ($P = .001$; adjusted mean, $P = .000$).

The IBA scores at baseline (before the intervention started) demonstrated less approach behaviors ($P = .01$) and more stress behaviors ($P = .01$) in the intervention group (Table III), most likely because these infants were more premature and were more ill before randomization. At 6 months corrected age, the outcomes on the IBA did not differ between the intervention and control groups. Table III also shows the changes in the IBA between baseline and 6 months corrected age. These scores suggest that despite a worse baseline performance, approach behaviors increased (+1.5; $P = .001$) and stress behaviors decreased to a greater extent (−1.7; $P = .003$) in the intervention group, indicating better regulatory development over time. To disentangle intervention effect from recovery from illness, we analyzed the IBA change scores, excluding infants with oxygen dependency of > 36 weeks. This did not change the results. A significant association between the 6-month outcomes on the categories approach and stress of the IBA and all scales of the BRS ($P = .000$) was found.

No differences between the groups were found in terms of neurologic outcome. In the intervention group, 8 infants had mildly abnormal performance and 1 infant had abnormal performance on the Touwen neurologic examination at 6 months. Nine infants of the control group scored mildly abnormal on this examination.

DISCUSSION

Our data show that the IBAIP improved developmental and neurobehavioral outcomes in our VLBW infants at age 6 months. Because of greater immaturity and illness, adjustments for baseline differences were warranted and revealed better mental and motor development in the infants in the intervention group. Consistent with the aim of the intervention, the intervention group also had more positive behavioral and neurobehavioral outcomes. This was demonstrated on the BRS by greater information processing and better emotional coping and motor quality and on the IBA by increased attention and engagement in interactions over time, accompanied by less stress. The neurobehavioral outcome should be interpreted with care, because of the limited psychometric research on the IBA; however, we found a significant association between the IBA and the BRS. We hypothesize that the IBAIP, in which parents are sensitized to their infant's behaviors to create optimal conditions for development, enhanced the infant's self-regulatory competence, which in turn benefited development.

A recent comparable study in Norway, using a modified version of the Mother–Infant Transaction Program (MITP),[14] also reported positive effects in infant regulatory competence (rated by the mother) between age 6 and 12 months.[27] At age 24 months, behavioral scores were better, but no effects on development were seen.[28] The original version of the MITP demonstrated 6-month effects in maternal role satisfaction, self-confidence, and perception of infant temperament preceding an increasing effect on infant cognition from age 36 months to school age.[15] Another recent study, however, found that early effects wash out in the long term,[16] which is consistent with the data from most other early intervention programs.[17] Efforts to identify infants who benefit the most from intervention, such as those with abnormal ultrasound findings, have demonstrated conflicting results.[16,17] Recent investigations have suggested that, apart from studying the sustainability of intervention effects, monitoring the infant during and shortly after the delivery of intervention by incorporating functional measures is needed to detect subtle changes, enable timely readjustments, and provide the active ingredients for sustained effects.[10,17]

A strength of our trial is that it was designed as a proactive program, was implemented by pediatric physical therapists, and included VLBW infants with various risk factors. This resulted in a comprehensive intervention model in which "prevention" and "treatment" overlapped to a large extent, supporting the infant's emerging functions, the parents, and the evolving infant–parent relationship. Despite the varying cultural backgrounds of the infants in the intervention group, 85 out of 86 received all planned sessions and were available for follow-up, indicating that strength-based intervention is feasible and relevant in a multicultural and high-risk population such as ours. Of interest is the fact that the specific intervention elements in this study seemed to target the early motor problems of preterm infants. The relationship between regulatory competence and motor development merits further exploration.

When evaluating our data, the emphasis should be on the size of the intervention effect and not on the exact Bayley scores, because Dutch scores have been found to be substantially higher than those in studies using American norms.[29] Given our findings, further study of the psychometric properties of the IBA seems worthwhile and may contribute to the improvement of early intervention practices and parental counseling. Moreover, a continuum of hospital-based and home-based individualized developmental care may strengthen the positive early effects of both separate programs.[30] We hypothesize that enhanced self-regulatory competence provides a stronger foundation for the infant's next developmental steps. A study to evaluate whether these positive effects are sustained at age 24 months is currently underway.

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Table I. Multivariate regression models: independent effect of factors on the MDI, PDI, and BRS of the BSID-II at 6 months corrected age

Variable	Coefficient	SE	Standardized Beta	*P* value
MDI				
GA, weeks	+ 0.65	+ 0.86	+ 0.07	.45
Male sex	− 2.79	+ 3.07	− 0.07	.36
Abnormal ultrasound	− 6.25	+ 3.47	− 0.14	.07
Oxygen therapy ≥ 28 days	−10.93	+ 4.16	− 0.24	.01
Intervention	+ 7.23	+ 3.1	+ 0.18	.02
PDI				
GA, weeks	+ 0.44	+ 0.68	+ 0.06	.51
Male sex	+ 0.29	+ 2.35	+ 0.01	.91
Abnormal ultrasound	− 5.55	+ 2.66	− 0.16	.04
Oxygen therapy ≥ 28 days	− 6.16	+ 3.34	− 0.17	.007
Indomethacin	− 8.62	+ 3.89	− 0.19	.028
Intervention	+ 6.36	+ 2.38	+ 0.20	.008
BRS orientation/engagement and emotional regulation				
GA, weeks	− 0.46	+ 1.01	− 0.04	.65
Male sex	+ 1.57	+ 3.53	+ 0.03	.66
Abnormal ultrasound	− 4.79	+ 3.93	− 0.09	.22
Oxygen therapy ≥ 28 days	− 11.71	+ 4.8	− 0.23	.016
Intervention	+ 12.10	+ 3.58	+ 0.26	.001
BRS motor quality factor*				
GA, weeks	− 0.01	+ 0.05	− 0.01	.89
Male sex	+ 0.28	+ 0.18	+ 0.12	.13
Abnormal ultrasound	− 0.3	+ 0.21	− 0.12	.14
Oxygen therapy ≥ 28 days	− 0.64	+ 0.25	− 0.24	.012
Intervention	+ 0.7	+ 0.19	+ 0.27	.00
BRS total score				
GA, weeks	− 0.41	+ 1.3	− 0.03	.75
Male sex	+ 6.22	+ 4.5	+ 0.1	.17
Abnormal ultrasound	− 6.78	+ 5.04	− 0.11	.18
Oxygen therapy ≥ 28 days	− 16.26	+ 6.15	− 0.25	.009
Intervention	+ 18.92	+ 4.59	+ 0.32	.00

Multivariate linear regression analyses: gestation, sex, abnormal ultrasound and oxygn therapy for ≥ 28 days are included in the model as constant factors; the use of indomethacin and septic episodes are entered stepwise.
*After log-transformation accounting for nonnormal distribution.

Table II. Sociodemographic and perinatal characteristics

	Intervention group (n = 86)	Control group (n = 90)	*P* value
Social factors			
Maternal age, years, mean (SD)	32.4 (5.4)	32.0 (5.2)	.79
Paternal age, years, mean (SD)	36.2 (7.1)	36.0 (6.3)	.46
Firstborn child, %	61 (71)	55 (61)	.73
Family status of 2 parents, %	70 (81)	82 (91)	.06
Mother born in The Netherlands, %	50 (58)	50 (56)	.73
Father born in The Netherlands, %	49 (57)	42 (47)	.2
Mother speaking Dutch, %	76 (88)	71 (79)	.69
Maternal education, %			
Not high school graduate	30 (35)	36/88 (41)	
High school graduate	56 (65)	52/88 (59)	.41
Paternal education, %			
Not high school graduate	33/82 (40)	34/87 (39)	
High school graduate	49/82 (60)	53/87 (61)	.88
Mother with job, %	63 (73)	53/87 (61)	.84
Father with job, %	70/82 (85)	69/86 (80)	.38
Perinatal factors			
GA, weeks, mean (SD)	29.6 (2.2)	30.0 (2.2)	.3
GA < 28 weeks, %	21 (24)	11 (12)	.04
Birth weight, g, mean (SD)	1242 (332)	1306 (318)	.2
SGA, %*	23 (27)	17 (19)	.635
Sex, male/female	50/36	41/49	.095
Twins/triplets, %†	27 (31)	26 (29)	.75
Antenatal steroid use, %	60 (70)	66 (73)	.6
Apgar score at 5 min, mean (SD)	8.4 (1.6)	8.5 (1.4)	.6
Artificial ventilation, %	43 (50)	32 (35)	.06
Days of ventilation, mean (SD)‡	7.7 (9.1)	4.9 (5.2)	.3
CPAP, %	75 (88)	65 (72)	.008
Oxygen therapy ≥ 28 days, %	34 (40)	18 (20)	.005
Oxygen therapy at GA 36 weeks, %	24 (28)	9 (10)	.002
Postnatal steroid use, %	5 (6)	2 (2)	.22
Indomethacin use, %	18 (21)	7 (8)	.014
Necrotizing enterocolitis, %	4 (5)	1 (1)	.16
Septic periods before discharge, %	52 (60)	35 (39)	.03
IVH grade I+II/III+IV§	15/6	9/5	.89
PVL grade 1/ 2+3§	11/1	8/2	.43
Ventricular dilatation	3	4	.75
ROP grade ≥ 3, %	4 (5)	1 (1)	.16
At discharge	(n = 86)	(n = 89)¶	
Postmenstrual age, weeks, mean (SD)	38.0 (16.6)	37.5 (16.4)	.96
LOS, days, mean (SD)	55.4 (25.9)	47.6 (21.7)	.03
Weight, g, mean (SD)	2415 (443)	2317 (469)	.29
Breast milk at discharge, %‖	40 (47)	48 (54)	.33
Oxygen supply at discharge, %	7 (8)	3 (3)	.17

CPAP, continuous positive airway pressure; IVH, intraventricular hemorrhage; LOS, length of stay; PVL, periventricular leukomalacia; ROP, retinopathy of prematurity; SGA, small for gestational age.
Values are number of infants unless stated otherwise. Independent-sample t tests and χ^2 tests were used unless indicated otherwise.
*SGA was defined as < 1 SD below the mean for Dutch reference data.
†At least 2 infants survived.
‡Mann-Whitney test.
§IVH was defined according to Papile et al;[25] PVL, according to de Vries et al.[26]
¶One infant died before discharge.
‖Either breast-fed or expressed milk.