Effect of the Newborn Behavioral Observations (NBO) System On Postpartum Maternal Depression

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Abstract

Objective. To investigate the effects of the Newborn Behavioral Observations (NBO) system on reducing postnatal maternal depression.
Methods. A total of 118 first-time mothers and their healthy full-term infants, from two hospitals, were randomized into intervention (59) and control (59) groups within each hospital. Intervention group mothers participated in the NBO between 24 and 48 hours after delivery and again in the home at one month. The NBO, an interactive observation system, made up of 18 neurobehavioral observations, was designed to sensitize the mothers to their newborn infant's capacities and individuality and to promote positive interactions between parents and their infants. Control group mothers received the routine postnatal care and a home visit at one month. At the one-month home visit, the depression status of 106 mothers (55 intervention/51 control) was assessed through the Edinburgh Postnatal Depression Scale (EPDS).
Results. Ten (9%) of the 106 mothers with available EPDS scores reported postpartum depression (EPDS > 12), with 15% in the control group and 4% in the intervention group (OR=0.20, exact 95%CI, 0.02-1.11; P=0.05 Fisher's exact test). The NBO decreased the odds of serious postpartum maternal depression by over 75%.
Conclusions. The NBO system was effective in preventing postpartum maternal depression in first-time mothers with full-term infants in the first month after birth.

Introduction and Aims

Postnatal depression is a common psychological condition among women with young children, with prevalence between 8-20% depending on how it is measured. There is evidence that the newborn period is a time of particular vulnerability for mothers and that postnatal depression, especially, can compromise the mother's ability to respond contingently to her infant's cues and to engage in affectionate responsive interactions with her infant. Because it often remains underdiagnosed and untreated, there is an increasing demand for preventive interventions to reduce the incidence of postnatal depression. The aim of the present study was to examine the effectiveness of a preventive approach to reducing the incidence of postnatal depression in the first month of life.

Based on over twenty-five years of research and clinical work with the NBAS, Nugent, Keefer, O'Brien, Johnson, Blanchard (2005) developed a short, flexible, easy to use scale, the Newborn Behavioral Observations (NBO) system, that can be used by pediatric professionals to teach parents about the newborn infant's capacities and to foster positive parent-child interactions. We hypothesized, therefore, that the NBO could have a powerful transforming effect on the mother by influencing the quality of her interactions with her infant, enhancing her sense of competence and thereby preventing the likelihood of postpartum depression. The present study is the first controlled study designed to examine the effects of the NBO on preventing postnatal depression.

Methods

The sample consisted of a total of 118 first-time mothers and their infants from two hospitals, who were randomized into intervention (59 mothers) and control (59 mothers) groups. Mothers were eligible if the following criteria were fulfilled: married or co-habiting, primiparous, aged 15 to 45. All infants had Apgar scores not less than 7 at 5 and 15 minutes, had no physical findings consistent with congenital anomalies, were between 36 and 42 weeks gestational age, and had not been in the NICU. Infants had not been circumcised on the day on which the NBO session took place.

The Intervention and Control Groups

Mothers randomized to the control group received the routine care practiced in the hospital nursery at the time of the study, and a home visit at one month. Mothers randomized to the intervention group received the routine care plus the NBO intervention in the hospital and in the home setting at one month. For both groups, the Edinburgh Postnatal Depression Scale (EPSD) was filled out at one-month home visit.
The NBO was administered in an unblinded fashion by four clinicians, who were trained in the administration of the NBO.

In the intervention group, the NBO session was conducted at the mother's bedside in the hospital, within the first two days of the life of her baby, and again at home after one month. Fathers and other family members were invited to participate in observing the infant's responses. The NBO itself took about 8-10 minutes to administer, although the sessions lasted longer depending on the parent's questions and the length of the joint discussion afterwards. As the clinician elicited the newborn's behavior, he described and interpreted each of the behaviors for the parents, in terms of the infant's strengths and in terms of the challenges or difficulties the infant was facing in his/her efforts to adapt to her new extrauterine environment. The session begins with an observation of the infant's capacity for habituation or sleep protection. The clinician then proceeds to elicit the hand-grasp, sucking and rooting and crawling reflexes and examines the infant's motor behavior, followed by the infant's capacity to respond to animate and inanimate visual and auditory stimuli. If the infant cries, the amount of crying and the ease or difficulty of consolability is observed, while the infant's overall state regulation and response to stress is also examined. Since it is an interactive scale, the parent's own observations and feelings are integrated into the session and the parents were invited to elicit and discuss the behaviors. Because the goal of the NBO is to provide an individualized profile of the infant's behavior to the parents, the clinician and parent discuss the implications of the baby's responses for the management of sleep, feeding, crying or infant stimulation throughout the session. The session ends with the clinician and parents developing a caregiving plan for their infant, by identifying the kinds of caregiving techniques that were more likely to foster and promote positive mother-infant interaction.

Outcome Measures

The primary outcome was the Edinburgh Postnatal Depression Scale , administered to all mothers at the one-month home visit. This 10-item self-report questionnaire assesses depressive symptoms experienced within the previous week and includes questions concerning mood, anxiety and suicidal ideation. Using a threshold of EPDS scores above 12, Cox et al. reported a sensitivity of 86% in identifying major postnatal depression and Harris et al reported a sensitivity of 95%. Murray and Carothers reported that with a threshold score of 12.5, the EPDS >12 correctly identified over 80% of mothers with major depression and 50% of those with minor depression. Based on these and other previous studies about the accuracy of the EPDS threshold scores in detecting mothers at risk for serious postnatal depression, we decided to use the EPDS score of >12 as an indicator of postpartum depression.

All randomized subjects with available EPDS scores were included in the comparative analysis. The proportion of mothers with postpartum depression (EPDS > 12) was compared between intervention and control groups using Fisher's exact test. The exact 95% confidence intervals (CIs) for the odds ratio (OR) were also calculated. Multiple logistic regression was performed to examine the adjusted effect of NBO on postpartum depression, adjusting for hospital, infant gender, and mother's education. A total of 108 of the 118 enrolled mothers completed the study from the birth of their child to the home visit at the end of the first month postpartum.

Effect of NBO on Postpartum Depression (EPDS > 12)

Ten (9%) of the 106 mothers with available EPDS scores reported serious postpartum depression (EPDS > 12) at the one-month home visit, with 16% in the control group and 4% in the intervention group (OR=0.20, exact 95%CI, 0.02 - 1.11; P=0.05 Fisher's exact test)

TABLE 1 – Postpartum depression and EPDS score by group*.

	Control (N = 51)	Intervention (N = 55)	*P* value
Depression (EPDS > 12), n (%)	8 (16)	2 (4)	0.05
EPDS score, Mean – SD	6.5 – 4.3	5.4 – 3.5	0.14

* Based on 106 subjects. Two subjects (1 intervention/1 control) were excluded because of missing EPDS.
† Based on Fisher exact test for postpartum depression and two-sample t-test for EPDS score.

After adjusting for hospital, infant's gender and mother's education, the adjusted OR for the risk of postpartum depression was 0.24 (95%CI, 0.04 - 1.32; P=0.07, which was similar to the crude OR. This OR suggests that the use of NBO reduced the risk of major depression by over 75% during the first month after birth. These results were comparable to those obtained in the more robust stratified analysis (OR = 0.25; exact 95% CI, 0.02 - 1.50; P=0.15). Neither baby's gender, nor mother's educational level, nor hospitals were statistically significantly associated with depression in univariate or multiple logistic regressions.

TABLE 2 – Adjusted effect of NBO on postpartum depression (EPDS > 12)*

Covariate	OR	95% CI	*P* value
Treatment			
Control	1.00	-	-
Intervention	0.24	(0.04–1.32)	0.07
Hospital			
1 (urban)	1.00	-	-
2 (community)	0.71	(0.18–2.76)	0.62
Baby s gender			
Girls	1.00	-	-
Boys	0.97	(0.24–3.87)	0.96
Mother s education			
High school or lower degree	1.00	-	-
College or higher degree	1.74	(0.39–7.74)	0.49

OR indicates odds ratio; CI indicates confidence interval.
* Based on 104 subjects. Four subjects were excluded from the analysis because of missing EPDS (1 intervention/1 control) or missing mother's education (1 intervention/1 control).
† Based on likelihood ratio tests.

Summary

The NBO was effective in preventing postpartum maternal depression in first-time mothers with full-term infants in the first month after birth and decreased the odds of serious postpartum maternal depression by over 75%. These results suggest that the NBO can have a powerful transforming effect on the mother by influencing the quality of her interactions with her infant, enhancing her sense of competence and thereby preventing the likelihood of postpartum depression.

Conclusions

Because of the growing demand for intervention programs to reduce the incidence of postnatal depression there is a growing number of programs for depressed mothers, such as support groups, cognitive-behavioral counseling (CBC), psycho-educational programs, mother-infant psychotherapy and family-based interventions, which have had some success in treating postnatal depression, although the results are equivocal. While more research needs to be done on the NBO, especially to determine if these early positive effects last, the results of this study suggest that the strength and effectiveness of the NBO in preventing postnatal depression may come both from the timing of the intervention and also from its design as an infant-focused approach to promoting parent-infant interaction.

In addition, because the NBO is flexible and easy-to-use, it can easily be integrated into routine pediatric exams, in hospital, clinic, early intervention or home settings. In a recent study of pediatric professionals (n=220) from 10 sites across the United States, 97% agreed that the NBO was good or excellent in helping parents learn about their newborns and maintained that using the NBO not only fostered the mother-infant relationship but it also made the clinicians themselves, feel more connected to the parents in their practice. Moreover, because the NBO was used in this study to provide parents with individualized information and guidance on their child's behavior and development, the results suggest that the individualized information and emotional support inherent in the NBO is more likely to be effective in reducing postnatal depression, if the NBO is presented in the context of relationship-based family-centered care.

Based on 25 years of research with the Neonatal Behavioral Assessment Scale (NBAS) (Brazelton, 1973; Brazelton and Nugent, 1995), the NBO system has been developed specifically for clinicians caring for newborn infants in hospital, clinic or home settings. The Newborn Behavioral Observations (NBO) system (Nugent, Keefer, O'Brien, Johnson, Blanchard, 2005) is an individualized infant-focused, family-centered observational set and can be used by practitioners to describe an infant's competencies and individuality. It is a brief neurobehavioral observation, consisting of 18 behavioral and reflex items, designed to examine the newborn's physiological, motor, state, and social capacities over the first three months of life. Because it is conceptualized as a participatory interactive session, the NBO is always administered in the presence of the parents and with the parents as active participants. The information derived from the NBO is used as a form of anticipatory guidance since it can help parents make informed choices about caregiving. In sum, this joint observation provides a forum for parents and clinicians to observe and interpret the newborn's behavior. It is designed to help parents read their baby's communication cues and is designed to promote a positive relationship between parents and their infants and between clinician and parents, from the very beginning.

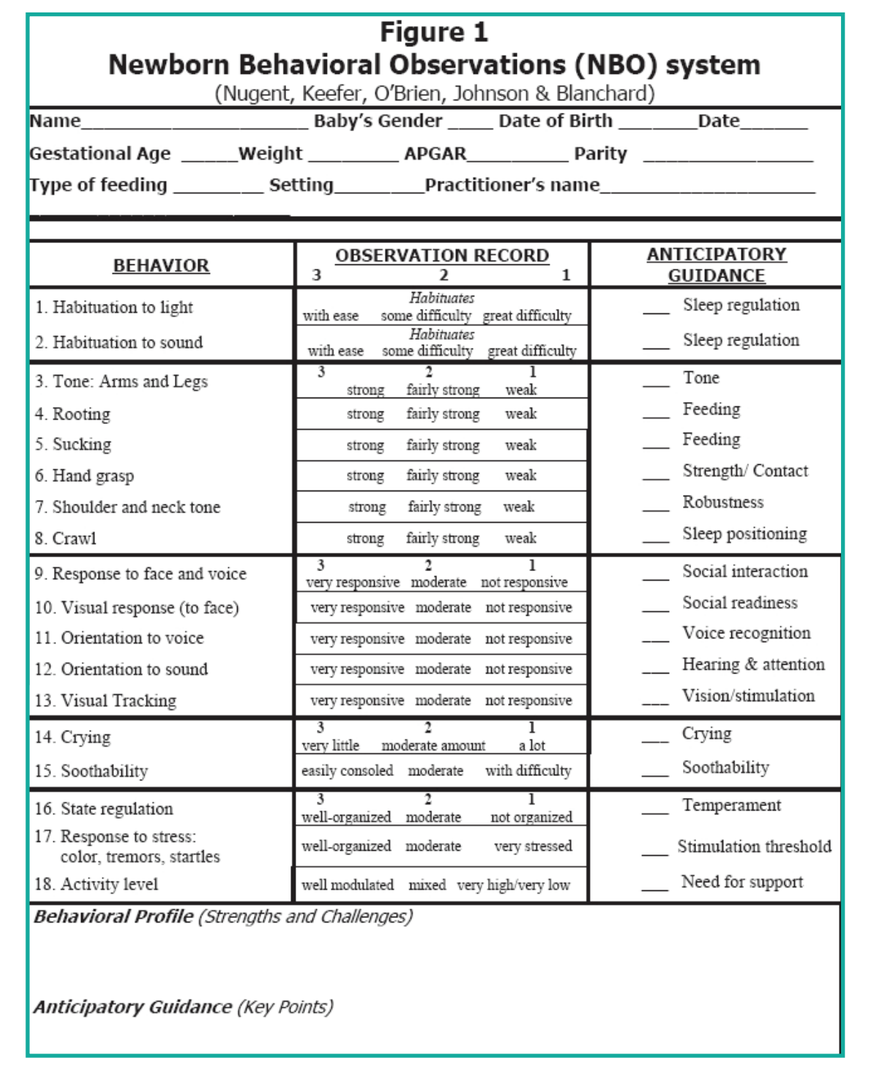

Figure 1
Newborn Behavioral Observations (NBO) system
(Nugent, Keefer, O'Brien, Johnson & Blanchard)

Name____________________ Baby's Gender ____ Date of Birth _______Date______
Gestational Age _____Weight ________ APGAR_________ Parity _______________
Type of feeding ________ Setting________Practitioner's name___________________

BEHAVIOR	OBSERVATION RECORD 3	2	1	ANTICIPATORY GUIDANCE
1. Habituation to light	*Habituates* with ease	some difficulty	great difficulty	___ Sleep regulation
2. Habituation to sound	*Habituates* with ease	some difficulty	great difficulty	___ Sleep regulation
3. Tone: Arms and Legs	strong	fairly strong	weak	___ Tone
4. Rooting	strong	fairly strong	weak	___ Feeding
5. Sucking	strong	fairly strong	weak	___ Feeding
6. Hand grasp	strong	fairly strong	weak	___ Strength/ Contact
7. Shoulder and neck tone	strong	fairly strong	weak	___ Robustness
8. Crawl	strong	fairly strong	weak	___ Sleep positioning
9. Response to face and voice	very responsive	moderate	not responsive	___ Social interaction
10. Visual response (to face)	very responsive	moderate	not responsive	___ Social readiness
11. Orientation to voice	very responsive	moderate	not responsive	___ Voice recognition
12. Orientation to sound	very responsive	moderate	not responsive	___ Hearing & attention
13. Visual Tracking	very responsive	moderate	not responsive	___ Vision/stimulation
14. Crying	very little	moderate amount	a lot	___ Crying
15. Soothability	easily consoled	moderate	with difficulty	___ Soothability
16. State regulation	well-organized	moderate	not organized	___ Temperament
17. Response to stress: color, tremors, startles	well-organized	moderate	very stressed	___ Stimulation threshold
18. Activity level	well modulated	mixed	very high/very low	___ Need for support

Behavioral Profile *(Strengths and Challenges)*

Anticipatory Guidance *(Key Points)*

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