Using the Neonatal Behavioural Assessment Scale to support parent-infant relationships

Interpreting their baby's signals and cues helps parents to bond with their baby and provide appropriate care. This article describes the clinical use of the Neonatal Behavioural Assessment Scale (NBAS) as a support to parents in understanding their baby's behaviour. The results of a pilot programme using the NBAS to support 22 families before and after discharge of their infant from a neonatal unit are presented.

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Key points

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1. Parents in neonatal units can feel distanced from their baby.
2. Understanding their baby's signals and cues helps parents to provide appropriate caretaking.
3. The NBAS and developmental care (NIDCAP) are linked.
4. All parents who participated in a programme using the NBAS before and after discharge found it helpful and would recommend it to other parents.
5. The NBAS helped parents to learn more about their baby and to adjust to their baby's behaviour.

The Neonatal Behavioural Assessment Scale (NBAS) is used to support parents in the neonatal unit, especially around discharge home. The aim is to increase parents' confidence in understanding their baby. Weekly sessions with parents using items on the NBAS commence on the baby's admission to the neonatal unit, and the full NBAS is administered before and after discharge home. This article describes the links between the NBAS and development care, followed by a discussion of parents' emotions, and babies' characteristics. Finally, the programme at the Rosie Hospital, Cambridge, using the NBAS is described.

Developmental care and the NBAS

The interest in developmental care in neonatal units is growing in the UK. Research has shown that minimising environmental noise, light and traffic benefits baby's growth and development. In addition, preventing pain, minimising handling, and encouraging skin-to-skin contact between baby and parent have beneficial effects on the baby and the parent-infant relationship[1]. Understanding babies' behavioural cues is becoming a vital part of neonatal care.

The practice of developmental care was pioneered by Heidi Als in 1986. She worked with Dr Berry Brazelton (**FIGURE 1**) in The Child Development Unit in Boston, and trained in the Neonatal Behavioural Assessment Scale, published in 1973[2]. Als first developed the APIB (Assessment of Preterm Infants' Behaviour), and from that the Neonatal Developmental Care and Assessment Programme (NIDCAP) for premature babies. This is based on the NBAS using behavioural states, the autonomic system, motor system, state organisational system, interaction system and self-regulatory system to analyse infant behaviour.

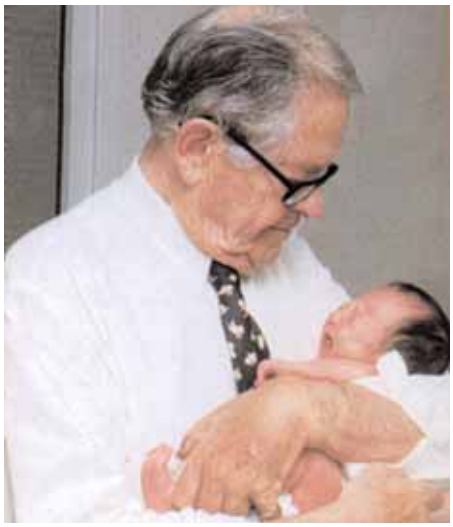

FIGURE 1 Dr Brazleton observing baby's strategies for consoling.

Als's synactive theory of development advocates an individualised approach to family-centred care with the emphasis on promoting infant organisation and enhancing optimal neurodevelopmental outcomes. Other outcomes were shorter hospitalisation, earlier nipple feeding, improved parent-infant interaction, and better developmental status at discharge and on follow-up.

Supporting parent-infant interaction

Helping parents understand their baby's signals and cues in the newborn period has

proved important in fostering strong parent-infant relationships[3-6].

Patterns of interaction are set up by three months of age, so for the mental health of the infant, it is vital for them to have harmonious interactions with their caregivers, based on their individual needs. Families of babies with developmental problems are helped by extra support in the neonatal period. If health professionals can forge a strong alliance with the families, these families are more likely to return for follow-up visits. Parents are more likely to discuss concerns about their baby when the health professional shares observations with the parent about the positive attributes of their baby.

Parents' feelings

It is important to remember the many reactions parents have to premature birth, and their reactions to having an ill baby in a neonatal unit[7,8]. Experiencing a feeling of loss is common to many parents in neonatal units, often before they even arrive in the neonatal unit. They may feel grief at the loss of the expected full-term, healthy baby they may have been planning for. They may also grieve the loss of the final months of their pregnancy when they are preparing psychologically for the birth of their baby. Parents can be very anxious about their ill baby's survival, and often fear becoming too close to their baby in case the infant does not survive. Parents also can suffer from shock at the unexpected early delivery of their baby. The baby may be extremely precious, especially if the parents have had previous losses or fertility treatment.

Parents in neonatal units often consider they have had the control of the care of their baby removed from them. When their baby is in intensive care, they can feel helpless. A mother's natural instinct is to nurture and protect her newborn baby, and she can feel as if this job has been taken away from her when she alone cannot provide the care her baby needs. Winnicott describes the time after birth as a period of primary maternal preoccupation when mothers are intimately involved with caring for their baby[9]. These moments cannot take place when her baby needs ventilation and highly skilled medical care. Many staff are aware of these difficulties and encourage as much contact as possible between parents and their baby. The timing and readiness of the parents must be taken into account, so a sensitive approach to both parent and baby is crucial.

Once the baby moves to special care, the parents can sometimes be seen as "difficult" by staff, as they seek to gain control as parents[10]. They are preparing themselves for going home, and becoming less dependant on staff for the care of their baby. It is well documented that parents can feel anxious about going home, and wonder if they will be able to look after their baby. Emotional support, and helping the parents feel confident about their baby becomes the focus in the SCBU. Using the NBAS can provide the necessary support.

Characteristics of babies

Babies who are born early are behaviourally challenging, they look different and have an uncertain outcome. Studies have shown that in a population of extremely premature babies, some may have social, cognitive, linguistic and behavioural disturbances. They may also have auditory, visual and neurodevelopmental deficits. The deficits are later manifested in information processing and attention-related disorders in school, which are probably due to an immature brain and lack of ability to counteract the effects of the environment[12]. The NBAS provides an understanding of the baby's behaviour, which may be complex in babies from neonatal units.

Content and features of the NBAS

The NIDCAP was designed to assess premature babies from birth. The NBAS was designed to assess full-term babies from 37-48 weeks' gestation. The NBAS can be used in conjunction with the NIDCAP, with babies who were premature or ill, when the baby is close to discharge home from the neonatal unit.

The Neonatal Behavioural Assessment Scale (NBAS)[2] (**FIGURE 2**) has been used in over 700 studies worldwide, as a systematic way of observing the individual baby's responses to moderately aversive (e.g. reflexes, motor tone) and non-aversive (e.g. tracking, turning to sound) stimulation.

Name _____ **Sex** _____ **Date of birth** _____

Gestataional age _____ **Weight** _____ **Height** _____ **Head circumference** _____

Mode of delivery _____ **Length of labour** _____ **Apgar scores** _____

Parity _____ **Type of feeding** _____ **Examiner** _____ **Date of exam** _____

Infant behaviour

Habituation	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**Comments**
Response dec. to light										
Response dec. to rattle										
Response dec. to bell										
Res. dec. to foot probe										
Social-Interactive	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**Comments**
Animate visual										
Anim. visual and auditory										
Inanimate visual										
Inanim. visual and auditory										
Inanimate auditory										
Animate auditory										
Alertness										

FIGURE 2 Brazelton Scale Scoring Form – continued on next page.

Motor system	9	8	7	6	5	4	3	2	1	Comments
General tone										
Motor maturity										
Pull-to-sit										
Defensive										
Activity level										
State organisation	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**Comments**
Peak of excitement										
Rapidity of build-up										
Irritability										
Lability of states										
State regulation	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**Comments**
Cuddliness										
Consolability										
Self-quieting										
Hand-to-mouth										
Autonomic system	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**Comments**
Tremulousness										
Startles										
Lability of skin colour										
Smiles										
Supplementary Items	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**Comments**
Quality of alertness										
Cost of attention										
Examiner facilitation										
General irritability										
Robustness and endurance										
State regulation										
Examiner's emot. resp.										

Reflexes	0	1	2	3	Asym	Comments
Plantar						
Babinski						
Ankle clonus						
Rooting						
Sucking						
Glabella						
Passive resist. – legs						
Passive resist. – arms						
Palmar (hand-grasp)						
Placing						
Standing						
Walking						
Crawling						
Incurvation						
Tonic dev. – head and eyes						
Nystagmus						
TNR						
Moro						

Summary: Infant

Strengths

Concerns

Summary: Parent(s)

Strengths

Concerns

Recommendations for caregiving:

FIGURE 2 Brazelton Scale Scoring Form continued.

The NBAS focuses on the non-medical attributes of the baby, and the baby's strengths. It presents a profile of the individual baby's ability to regulate behaviour, and raises awareness in the observer of how to assist the infant in modulating state control and alertness. It documents the interactional capacities of the individual infant and therefore helps the health professional to understand the parent's comments and observations of their baby. By sharing the baby's behaviour with the parents, the health professional can validate these observations, which helps to increase the parental self-confidence. It also opens discussion about the baby's strengths and difficulties, and the parent's anxieties and concerns.

The NBAS contains 28 behavioural items, 18 reflex items (as in Prechtl's exam[13]), and 7 supplementary items for fragile or high-risk infants. It is a neuro-behavioural screening tool, and will identify gross abnormalities or asymmetries. All items are administered when the baby is in the appropriate behavioural state (States 1-6, from deep sleep to crying), and there is a sequence to follow. The NBAS seeks to score the baby's best performance, so that the examiner is working to elicit the best possible reactions from the baby. It provides information about how babies manage to protect their sleep, comfort themselves and organise their sleep and awake states.

Research has shown that observations of the baby's behaviour, leading to appropriate caregiving helps to enhance the sensitivity and caretaking efficiency of parents[14]. There is empirical evidence that understanding the baby's signals can increase the mother's self-confidence, and improve her caretaking style[15-17]. It can also enhance paternal involvement and responsiveness[18, 19]. In South African mothers the NBAS was found to enhance maternal sensitivity[20]. Using it as an intervention improved cognitive scores in a low birthweight sample followed to four years of age[21], and improved the development of preterm infants[22].

FIGURE 3 Dr Joanna Hawthorne carrying out the NBAS on a full-term baby.

Brazelton (NBAS) programme in Cambridge

In 2001, the Community Neonatal team and the psychologist (**FIGURE 3**) set up a programme at the Rosie Hospital, Cambridge to support parents in understanding their baby's signals and cues, in order to gain confidence and provide support on discharge home. Parents were referred if they had anxieties about the baby, their relationship or caretaking.

Often parents are excited but anxious about taking their baby home, and the NBAS provides reassurance to the parents about their ability to read their baby's behaviour. Parents can ascribe meanings to the behaviours of their baby, which do not correlate with their baby's cognitive levels. The NBAS helps parents to see behaviours for what they are, without believing their child is naughty or trying to punish them. The NBAS also helps parents focus on their baby's strengths, despite their difficulties.

Protocol

The programme was carried out by the psychologist and consisted of three phases:

Initial meeting and follow-up

This involved meeting parents, establishing a rapport with the mother/father by asking what their baby is like – his or her preferences, behaviours and personality and then listening to the parent's observations and reinforcing them.

Subsequently while the baby remained on the unit, weekly visits afforded the opportunity to continue to observe the baby's behaviour with the parents.

The "Ten Points" shown in **FIGURE 4** were covered during the course of the baby's stay and were used as a guideline to the conversations with the parents[23]. After listening to their comments, information about the baby's behavioural states, strategies for self-calming, and ways to understand the baby's stress signs, was offered as necessary. This is an exercise in listening to the parent's observations and reinforcing their belief in themselves as parents and as good observers of their baby.

- What is your baby like – his/her personality?
- What does your baby like to do/ look at?
- How does your baby react to noise and light?
- How does your baby react to handling?
- What position does your baby like to be in?
- How does your baby manage his/her sleep and awake states?
- How does your baby comfort him or herself?
- Is your baby cuddly?
- Is your baby strong?
- How does your baby show you he/she knows you?

FIGURE 4 Ten points for discussion with parents during the baby's stay.

Predischarge visit

At this visit, 2-5 days before hospital discharge, the full NBAS was carried out, discussing the baby's interactive abilities, efforts for self-regulation, and reflexes. Any concerns the parents had about their baby were identified and addressed.

Post discharge visit

The full NBAS was performed again about two weeks after discharge to home, to determine the changes from the first assessment, and define areas needing support. The positive abilities of the baby were emphasised and any difficulties or concerns about the baby's development discussed.

Babies (22)	
Firstborn	13
Second/third born (including twins)	7
Surviving twin	2
Under 28 weeks gestation	8
28-35 weeks gestation	11
Over 35 weeks gestation	3
Mothers (21)	
Teenage mothers	5
Over 35 years old	6
Others	10
Professional	9
'A' levels	6
No 'A' levels	6

TABLE 1 Characteristics of parents and babies in the NBAS programme.

Further visits and telephone contact was available as needed. The time scale of these visits was varied to suit the needs of the individuals and families were seen at outpatient clinics or the Neurodevelopmental Follow-up Clinic, so the number of clinics they attended was reduced. Some families were seen at home. The baby's behaviour was scored on the NBAS scoring sheet, and inserted in the baby's notes, along with a summary paragraph about the NBAS and recommendations for caregiving.

Results of the parental questionnaire about the NBAS programme

Twenty-two babies were recruited after admission to the neonatal unit. Characteristics of the mothers and babies are seen in **TABLE 1**. Questionnaires were sent to the parents two weeks after the final follow-up visit. Responses can be seen in **TABLE 2**.

		Scores of '4, 5' Yes, a lot, very much (%)
1.	Did you find the NBAS useful?	100 (inc. '3')
2.	Anything you found out you had not noticed before?	46
3.	Did the sessions help you feel you knew your baby better than before the Assessment?	57
4.	Do you feel these sessions helped you adjust to your baby's behaviour?	64
5.	Did the sessions help you feel more confident about looking after your baby?	43
6.	Did you feel that your needs and your baby's needs for emotional support were being met?	62
7.	Did you feel that your need for information about your baby's behaviour was being met?	54
8.	Did you feel your baby benefited from having the Assessment?	57
9.	Would you have liked more or fewer visits, or was it just right?	57 (wanted more visits)
10.	Would you recommend the Assessment to other parents?	100

TABLE 2 Results from the postal questionnaire (74% responded).

All parents agreed to take part, and found the NBAS helpful and would recommend it to other parents. Parents are amazed to see their baby follow a moving object, turn to a rattle, and turn to their voice rather than another voice. They see their baby's reflexes as skills as they watch them curl and splay their toes, and show walking and crawling actions. If the baby cries, parents find the consoling steps on the NBAS helpful as they see that the baby often makes attempts at self calming by sucking fist or fingers, listening or looking around. Parents also see how their baby manages sleep and awake states, and how much support the baby needs to remain in a calm, alert state. They gain information about how difficult or easy it is for the baby to remain in a deep sleep when disturbed. The NBAS reinforces a lot of the parents' observations and provides explanations for many of the behaviours they see.

Almost half the mothers (46%) found that the NBAS told them something about their baby they had not noticed before. The majority of mothers (64%) felt the sessions had helped them adjust to their baby's behaviour, and 57% of mothers felt that their baby had benefited from the NBAS. Most mothers (62%) felt that their needs and their baby's need for emotional support were being met.

Many parents wrote comments about the intervention illustrating their thoughts – see **FIGURE 5**.

In discussions, the staff and Community team reported that they felt the parents were more confident, less hostile and more accepting of their baby's situation.

The NBAS helped to give control of their baby back to the parents after an extended time when mostly the staff were looking after the baby. The programme is continuing at the Rosie Hospital, and rolling teaching sessions about developmental care and the NBAS take place, along with training in the NBAS for some of the staff. Once trained, elements of the NBAS can be incorporated into discharge examinations. In addition staff find the knowledge gained from the NBAS changes the way they work with parents, helping them to become more collaborative with parents, and more observant and respectful of the baby's needs.

"Bonding is difficult in the NICU. Baby does not feel like your own. The assessment helps to affirm you do know your baby".

"Gave us the ability to see him as a 'normal' developing baby and not seem like a medical patient".

"Sessions helped us relax and enjoy time spent with him rather than anticipating the worst".

"Hadn't previously realised how much it was possible to interact with her and therefore played with her much more following sessions".

"Amazing to me to see someone being so positive about my baby who was so sick".

"I do now spend longer watching her and adapt my behaviour depending on hers".

"Gave me confidence we were on the right track".

"I practised calming techniques with my baby and watched her more carefully and this helped with getting to know her".

"Before and after the Assessment, I spent almost everyday with her. Afterwards, I just knew for certain that our guesses about her behaviour were true".

FIGURE 5 Parent's comments.

Conclusion

A supportive programme using the NBAS was devised to provide ongoing support to parents before and after discharge home from the neonatal unit. These parents may be at risk for postnatal depression, post-traumatic stress disorder, and emotional or relationship difficulties with their babies. Babies born prematurely, or ill, or who have suffered a perinatal trauma are compromised, and can suffer emotional trauma too, along with other developmental problems. The NBAS provides a behavioural profile of the baby and helps to formulate non-medical caregiving strategies.

Several recent initiatives have highlighted the need to support parents and understand newborn babies. The National Service Framework for Children, Young People and the Maternity Services[24] advocates that children's services should be designed around the needs of the whole child. It also advocates preventative programmes. Balbernie[25] highlights the need for a focus on the parent-infant relationship with multidisciplinary teams providing a range of interventions. Referrals should be made for problems with parent/infant interaction. The BLISS Baby Charter states that every child in the UK has the right to benefit from the information and support needed by parents to help them care for their baby and achieve the best quality of life possible[26]. Premature babies should be respected and have participation rights, as do older children[27]. Early relationships need special support[28]. Using the NBAS provides a supportive programme for parents of premature and ill babies at a most vulnerable time.

References

1. **Als, H.** A synactive model of neonatal behavioural organisation: Framework for the assessment of neurobehavioural development in the premature infant and for support of infants and parents in the neonatal intensive care environment. *Physical Occupational Therapy Paediatrics* 1986; **6**: 3-55.
2. **Brazelton, T.B., Nugent, J.K.** The Neonatal Behavioural Assessment Scale. Third edition. Clinics in Developmental Medicine 137. London: MacKeith Press, CUP. 1995.
3. **Klaus, M.H., Kennell, J.H., Klaus, P.H.** Bonding. Reading, Mass: Addison-Wesley. 1995.
4. **Sameroff, A.J.** Models of development and developmental risk. In: C.H. Zeanah, ed. Handbook of Infant Mental Health. New York/London: The Guildford Press. 1993.
5. **Field, T.** Affective and interactive disturbances in infants. In: J. Osofsky, ed. The Handbook of Infant Development 2nd ed. New York: Wiley. 1987. 972-1005.
6. **Meisels, S., Dichtelmiller, M., Fong-Ruey, Liaw.** A multidimensional analysis of early childhood intervention programs. In: C. Zeanah, ed. Handbook of Infant Mental Health. New York/London: The Guildford Press. 1993.
7. **McFadyen, A.** Special Care Babies and their Developing Relationships. London: Routledge. 1994.
8. **Cohen, M.** Sent before my time – a child psychotherapist's view of life on a neonatal intensive care unit. London: Karnac. 2003.
9. **Winnicott, D.W.** The Maturational Processes and the Facilitating Environment. New York: International Universities Press. 1982.
10. **Hawthorne, J.** Belonging: Parent-infant relationships in neonatal units around transfer. Presentation at RSM conference. April, 2005.
11. **Brazelton, T. Berry.** Touchpoints: Your child's emotional and behavioural development. London: Karnac. 1995.
12. **Marlow, N., Wolke, D., Bracewell, M., Samara, M.** Neurologic and developmental disability at 6 years of age following extremely preterm birth. *New Engl Med* 2005; **352**: 9-19.
13. **Prechtl, H.F.R.** The Neurological Examination of the Full-term Newborn Infant. Clinics in Development Medicine, London: Heinemann. 1977: 63.
14. **Nugent, J.K., Brazelton, T.B.** Preventive infant mental health: Uses of the Brazelton Scale. In: Osofsky, J.D., Hiram, E. Fitzgerald, H.E, eds. WAIMH Handbook of Infant Mental Health: Early intervention, Evaluation and Assessment 2nd volume. J. Wiley & Sons. 2002.
15. **Anderson, C.J., Sawin, D.** Enhancing responsiveness in mother-infant interaction. *Infant Behavior Develop* 1983; **6**(3): 361-68.
16. **Beal, J.A.** The Brazelton Neonatal Behavioural Assessment Scale: A tool to enhance parental attachment. *J Pediatric Nursing* 1986; **1**: 170-77.
17. **Britt, G.C., Myers, B.J.** The effects of Brazelton intervention: A review. *Infant Mental Health* 1994; **15**: 278-92.
18. **Beal, J.A.** The effect on father-infant interaction of demonstrating the Neonatal Behavioural Assessment Scale. *Birth* 1989; **16**: 18-22.
19. **Myers, B.J.** Early intervention using Brazelton training with middle-class mothers and fathers of newborns. *Child Development* 1982; **53**: 462-71.
20. **Cooper, P.J., Landman, M., Tomlinson, M., Molteno, C., Murray, L., Swartz, L.** Impact of a mother-infant intervention in an indigent peri-urban South African context. *Br J Psychiatry* 2002; **180**: 76-81.
21. **Rauh, V., Achenbach, T., Nurcombe, B., Howell, C., Teti, D.** Minimizing adverse effects of low birthweight: Four-year results of an early intervention program. *Child Development* 1988; **59**: 544-53.
22. **Widmayer, S., Field, T.** Effects of Brazelton demonstrations for mothers on the development of preterm infants. *Pediatrics* 1981; **67**: 711-14.
23. **Hawthorne, J., Hutchon, B.** Using the NBAS in Community Health settings: The UK. In: Brazelton, T.B., Petrauskas, B., Nugent, J.K, eds. Looking back, looking forward: What we now know about newborn infants and their families and what we need to do next. Johnson and Johnson Pediatric Institute. 2005. In press.
24. **Department of Health.** National Service Framework for Children, Young People and Maternity Services. Department of Health Publications. 2004.
25. **Balbernie, R.** An infant mental health service. The importance of the early years and evidence-based practice. The Child Psychotherapy Trust. 2002.
26. **BLISS.** Special care for sick babies – choice or chance? The BLISS Baby Report and Baby Charter. No. 1. BLISS. July 2005.
27. **Alderson, P., Hawthorne, J., Killen, M.** The participation rights of premature babies. *Int J Children's Rights* 2005; **13**: 31-50.
28. **Brazelton, T.B., Cramer, B.G.** The Earliest Relationship. London: Karnac. 1991.

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