

NEONATAL BEHAVIOR IN FULL TERM SMALL FOR DATE

P. Abrol
R. Kapoor
G. Gathwala
S. Tiwari
A.D. Tiwari

ABSTRACT

Fifty newborns, 25 full term SFDs (small for date) and 25 full term AGAs (appropriate for gestational age) were taken up for comparative study of their behavior using BNBAS (Brazelton's neonatal behavior assessment scale). The study revealed that full term SFDs performed significantly poorly on all items under cluster interactive processes compared to their counterparts full term AGAs on day 1. They also showed similar poor performance in clusters of motor processes and organizational processes (State control). Follow up assessment on day 30 revealed significantly better performance in these clusters. However, the performance of SFD babies in all items of cluster of organizational processes (physiological response) was comparable to that of AGA babies in the initial as well as follow up assessments.

Key words: Neonatal behavior, Small for date, Brazelton neonatal behavior assessment scale.

From the Departments of Pediatrics and Obstetrics and Gynecology, Medical College and Hospital, Rohtak.

Reprint requests: Dr. Pankaj Abrol, 25/9J, Medical Enclave, Rohtak 124 001.

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A newborn infant is not as helpless as he seems and greatly influences the care he receives from those around him by the way he interacts/behaves. Calling a baby full term and healthy arouses behavioral expectations of a very specific kind. Small for date (SFD) infants have been noted to be at risk for various nutritional, metabolic, immunological and hematological changes. However, only few authors have studied the behavior of SFD newborns(1-3). We, therefore, undertook the present study to compare the neonatal behavior of full term appropriate for gestational age (AGA) and full term small for date (SFD) newborns.

Material and Methods

Fifty newborns delivered at Medical College and Hospital, Rohtak were taken up for the study. Of these, 25 were full term (37-40 weeks) appropriate for gestational age (birth weight between 10th and 90th centile) and constituted the control groups. The remaining 25 were full term small for gestational age (birth weight less than 10th centile) which comprized the study group. All the babies were delivered normally by the vaginal route after an uneventful antenatal period and had an Apgar score of atleast 8 at one and five minutes. No maternal anesthesia w& used. An attempt was made to keep the sex distribution equal in the two groups. Babies with congenital malformations were excluded from the study.

The behavior items for the purpose of analysis were grouped into four clusters, *i.e.*, (i) Interactive processes which included orientation items, alertness, cuddliness and consolability; (ii) Motor processes which measure motor performance; (iii) Organizational process (physiological response to stress) which record signs of stress related to homeostatic adjustment of the general

nervous system; and (iv) Organizational processes (state control) which measure the neonatal response when aroused or the ability to respond to environmental input. The data was analysed using the Chi-square test.

Results

The maternal and paternal age, family size and composition relating to number of adults and children, social support and sex distribution of babies was comparable in the two groups. Eighty eight per cent in the study group and 92% in the control group belonged to Classes IV and V of Prasad's classification(5).

The mean gestational age was 38.8 weeks in the study group and 38.9 weeks in the control group. The mean birth weight in

the study group was 2.1 kg compared to 2.9 kg in the control group. Apgar scores at 1 and 5 minutes were comparable in the two groups.

Assessment on the BNBAS revealed a significantly poorer performance on all items under interactive processes by the SFD babies compared to the AGA babies on day one. Although this showed improvement with time, the differences were still significant on day 30 (Table I). Interactive processes are a measure of the infant's capacity to respond to social stimuli, especially during the alert state.

Motor process measure the infant's ability to maintain adequate tone, to control motor behavior and to perform integrated motor actions. The SFD babies performed

TABLE I - BNBAS-Interactive Processes

| Interactive processes | *Day-1 | | *Day-5 | | *Day-10 | | *Day-30 | |
|-----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | Mean ± SD | | Mean ± SD | | Mean ± SD | | Mean ± SD | |
| | AGA (n=25) | SGA (n=25) | AGA (n=25) | SGA (n=25) | AGA (n=25) | SGA (n=25) | AGA (n=25) | SGA (n=25) |
| <i>Orientation</i> | | | | | | | | |
| Visual inanimate | 3.7±2.1 | 4.3±1.4 | 5.9±0.6 | 4.3±1.1 | 6.1±0.8 | 4.8±0.7 | 6.8±1.3 | 5.0±1.0 |
| Visual animate | 5.5±2.1 | 3.8±0.9 | 5.7±0.8 | 3.8±0.4 | 6.0±1.5 | 3.9±0.9 | 6.9±0.8 | 4.3±1.1 |
| Auditory inanimate | 5.3±1.0 | 3.2±1.3 | 5.5±1.3 | 3.1±1.1 | 6.1±1.3 | 3.6±0.4 | 7.0±1.6 | 4.6±1.2 |
| Auditory animate | 6.3±1.0 | 4.2±0.5 | 6.4±1.0 | 4.1±0.7 | 6.6±1.2 | 4.5±0.6 | 6.9±1.2 | 5.0±0.7 |
| Visual and auditory animate | 5.4±2.1 | 3.8±0.8 | 5.8±1.5 | 3.8±0.7 | 5.8±1.1 | 4.0±1.0 | 7.1±1.4 | 4.8±1.2 |
| -Alertness | 5.1±2.6 | 3.6±1.1 | 3.4±1.1 | 3.4±1.0 | 5.9±0.9 | 3.8±1.3 | 6.9±0.4 | 4.3±1.7 |
| -Cuddliness | 4.8±0.9 | 3.1±0.9 | 5.0±1.4 | 3.3±1.3 | 5.1±1.1 | 3.8±0.8 | 6.1±0.7 | 4.1±1.6 |
| -Consolability | 6.4±0.8 | 4.2±0.6 | 6.7±1.7 | 4.6±0.6 | 7.0±1.2 | 4.9±1.2 | 7.3±1.1 | 3.2±0.5 |

* p <0.001.

poorly on all items under motor processes and the differences continued to be significant even on day-30. (Table II).

Organizational processes (physiological response to stress) measure the infant's physiological stability in response to stress. The performance of the SFD babies was comparable to that of the AGA babies for all items under this cluster on the initial and follow up assessments.

Organizational process (state control) indicate the infant's ability to organize his states and to shut out disturbing stimuli when asleep. The differences for the items under this cluster were significant between the two groups with the SFD babies performing poorly on the initial and the follow up assessments (Table III).

A comparison of small for date babies on day-1 and day-30 for interactive and motor processes revealed a significantly better performance on day-30 compared to day-1.

For organizational processes (physiological response to stress), such a comparison did not reveal any significant differences except for the item lability of skin color. Organizational processes (state control) again revealed significant differences indicating a better performance on day-3 compared to day-1. A similar comparison between day-1 and day-30 performance revealed similar findings in AGA babies also.

Discussion

Although the physiological stability was comparable in the two groups, the behavior of the SFD neonates differed significantly from their AGA counterparts. They interacted significantly more poorly with their environment compared to the AGA babies and tended to have poor tone, low activity levels, poor hand to mouth coordination, poor defensive reaction and jerky movements of limbs. They were less adept at organizing their states and in shutting out

TABLE II-BNBAS-Motor Processes

| Motor process | *Day-1 | | *Day-5 | | *Day-10 | | *Day-30 | |
|------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | Mean ± SD | | Mean ± SD | | Mean ± SD | | Mean ± SD | |
| | AGA (n=25) | SGA (n=25) | AGA (n=25) | SGA (n=25) | AGA (n=25) | SGA (n=25) | AGA (n=25) | SGA (n=25) |
| Defensive movement | 5.7±1.2 | 4.4±1.0 | 6.0±1.2 | 4.8±1.6 | 6.8±1.1 | 5.0±1.2 | 8.2±1.5 | 5.4±1.7 |
| Motor activity | 6.3±0.9 | 4.6±0.7 | 6.4±1.4 | 5.1±0.7 | 7.0±1.8 | 3.3±1.3 | 8.3±1.7 | 6.0±1.6 |
| Motor maturity | 6.9±1.0 | 5.4±1.3 | 7.0±0.6 | 5.9±0.9 | 7.2±1.2 | 6.3±1.2 | 8A±1.8 | 6.8±1.0 |
| Hand to mouth facility | 6.8±1.3 | 3.2±1.1 | 7.0±1.4 | 5.7±0.9 | 7.2±1.3 | 6.0±1.0 | 8.1±1.1 | 6.6±1.2 |
| General tone | 6.4±2.2 | 4.9±1.5 | 6.6±1.6 | 4.9±1.1 | 6.9±1.4 | 3.2±0.7 | 8.4±1.3 | 6.1±0.9 |
| Pull to sit | 6.9±0.9 | 5.1±1.6 | 7.4±1.3 | 5.6±1.5 | 7.9±1.2 | 5.8±1.1 | 8.7±1.4 | 5.9±1.0 |

* p <0.001.

TABLE III-BNBAS-Organizational Processes (State Control)

| Organizational processes (State control) | *Day-1 | | *Day-5 | | *Day-10 | | *Day-30 | |
|--|------------|------------|------------|------------|------------|------------|------------|------------|
| | Mean ± SD | | Mean ± SD | | Mean ± SD | | Mean ± SD | |
| | AGA (n=25) | SGA (n=25) |
| Response decrement | | | | | | | | |
| -to light | 6.3±2.1 | 5.1±1.2 | 6.6±1.3 | 3.2±1.3 | 6.8±1.4 | 3.6±1.7 | 7.1±1.1 | 3.9±1.9 |
| -to rattle | 6.1±2.2 | 4.6±1.7 | 6.2±1.2 | 4.8±0.8 | 6.3±1.0 | 5.0±1.0 | 6.6±0.6 | 5.3±1.3 |
| -to bell | 6.3±1.9 | 4.1±1.3 | 6.4±1.4 | 4.3±0.9 | 6.6±0.8 | 4.3±0.7 | 6.9±0.9 | 4.9±1.1 |
| - to pinprick | 5.7±0.8 | 3.2±1.4 | 5.6±0.6 | 3. 6±0.6 | 5.8±0.7 | 3.7±1.1 | 6.1±1.5 | 4.3±1.0 |
| Peak of excitement | 4.2±0.7 | 2.5±0.05 | 4.1±0.6 | 2.9±0.4 | 4.6±0.8 | 3.1±1.0 | 3.0±1.0 | 3.7±0.8 |
| Irritability | 6.2±0.9 | 4.1±0.6 | 6.2±1.2 | 4.3±1.3 | 6.6±0.7 | 4.3±0.9 | 6.9±0.9 | 4.8±1.5 |
| Lability of states | 6.3±2.1 | 4.7±1.3 | 6.2±1.1 | 4.6±1.1 | 6.3±1.0 | 4.8±0.6 | 6.6±0.6 | 3.2±1.2 |
| Self quieting | 6.1±2.6 | 4.5±1.6 | 6.6±1.7 | 4.6±1.6 | 6.5±1.2 | 4.2±1.0 | 6.9±1.0 | 5.0±1.2 |
| Rapidity of build up | 7.4±2.2 | 3.2±1.8 | 7.6±0.7 | 5.7±1.7 | 7.5±1.3 | 3.8±0.8 | 8.2±1.3 | 6.2±1.1 |

*p<0.0 1.

disturbing stimuli. Differences in behavior noted on day-1, persisted throughout follow up. Most behavioral items showed statistically significant improvement from day-1 to day-30 in SFD babies and a comparable improvement in AGA babies. Brazelton himself reported observations similar to these(1,3). However, in a recent study on Indian babies, SFD babies scored significantly higher for the orientation responses compared to their full term AGA counterparts. Their capacity for orientation was reportedly excellent and they had very good state control and good muscle tone(2). Apparently, the mothers of the SGA infants in this study handled and interacted more with their babies. This might possibly explain the observed differences in the

behavior of SGA in infants of this study and ours. Yet another study reported similar findings(6).

There have been several reports on how the behavior of a newborn infant affects the caretaking he receives from those around him(7). A recent report highlighted the adverse effects on attachment behavior of mothers by the less than optimal interactive behavior of their babies(8). The SFD babies too may be expected to have a similar effect on their mothers. The reactions of the caretaker to an unattractive, largely unresponsive fragile baby may be anxiety and feelings of inadequacy. These would adversely affect mother-baby interaction which in turn would have a negative influence on the infant's behavior.

SFD babies probably need greater interaction and stimulation from their mothers than their AGA counterparts to ensure early positive mother-baby interaction. This would promote their cognitive and social development[^], 10). Mothers of SFD babies need to be educated regarding this aspect of their babies' behavior to mitigate some of the anxiety and tension that might hamper mother-baby interaction.

REFERENCES

1. Brazelton TB. The behavior of the full term but underweight newborn infant. *Dev Med Child Neurol* 1976,18: 590-602.
2. Iyer RS, Chetan R, Venkatesh A. Neonatal behavior of small for gestational age infants. *Indian Pediatr* 1989, 26: 987-991.
3. Brazelton TB, Ironic E, Lechtig A. The behavior of the nutritionally deprived Guatemalan infants. *Dev Med Child Neurol* 1977, 3: 364-372.
4. Brazelton TB. Neonatal behavior assessment scale: SIMP Monographs Clin Dev Med No. 50. London, William Heinemann Medical Books, 1973.
5. Prasad BG. Changes proposed in the social classification of Indian families. *J Indian Med Assoc* 1970, 55: 198-199.
6. Brazelton TB, Robey JB, Coller GA. Infant development in Zinacateco Indians of southern Mexico. *Pediatrics* 1969, 44: 274-290.
7. Osofsky J, Danzger B. Relationships between neonatal characteristics and mother infants interaction. *Developmental Psychology* 1974, 10: 124.
8. Sathwala S, Narayanan I. Effects of cesarean section on mother-baby interaction. *Indian Pediatr* 1991, 2: 45-50.
9. Sigman M, Cohen SD, Beckwith L, *et al.* Social and family influences on the development of preterm infants. *J Pediatr Psychol* 1981, 6:1-13.
10. Ainsworth M, Bell S. Mother infant interaction and development of competence. *In: The Growth of Competence*. Eds Connolly KJ, Brunner J. London, Academic Press 1974, pp 97-118.