Visiting Less Than Every Day

A Marker for Later Behavioral Problems in Finnish Preterm Infants

Reija Latva, MD; Liisa Lehtonen, MD; Raili K. Salmelin, PhD; Tuula Tamminen, MD

Objective: To investigate the effect of parental visits during neonatal intensive care on the behavioral and emotional development of the child at school age.

Design: All premature infants born in Tampere University Hospital in Tampere, Finland, in 1989 who were admitted to the neonatal intensive care unit and who lived in the Tampere region (N=67; 31 boys and 36 girls) formed the study group. Data on parental visits were collected from the hospital records. Child behavior was evaluated according to the Achenbach Child Behavior Checklist at the age of 7 to 8 years. A total of 48 (72%) of the mothers returned the questionnaires.

Results: The median number of visiting days per week was 6.2 for the mothers and 4.7 for the fathers. The children whose mothers visited daily had fewer behavioral and emotional problems at school age than those who had had fewer visits from their mothers (P = .04). The visiting frequency of the fathers was not significantly associated with later behavioral and emotional problems of the child. In this study, infrequent visits by the mother were a stronger risk factor for later psychological development than the medical risks of the preterm infant.

Conclusions: Infrequent visits by mothers to the neonatal intensive care unit seem to be a marker for their children’s later behavioral and emotional problems. This emphasizes the significance of early parent-infant contact and the vulnerability in early interaction. Less frequent visits may also indicate factors influencing the parent-child relationship in a way that leads to subsequent behavioral problems.

Arch Pediatr Adolesc Med. 2004;158:1153-1157

T HE BIRTH AND OFTEN LONG-TERM hospitalization of a premature infant are stressful for the parents. According to Miles et al,1 the most stressful features in the neonatal intensive care unit (NICU) for parents were the alterations in the parental role and the appearance and behavior of their infants. The medical condition of the newborn, parental stress, and the environment of the NICU complicate the development of close contact and early interaction between the newborn and his or her parents. In addition, separation caused by hospitalization disrupts parent-infant interaction and may have an effect on the developing parent-child relationship.

In the seventies, researchers suggested that early contact in the first few hours after birth was of great importance and affected the subsequent parent-child relationship.2 During subsequent decades, the developing care practices in the NICUs have increasingly supported and encouraged parents to visit the NICU and to participate in the neonatal care of the infant. However, only a few studies have examined parental visits to the NICU. Older studies indicate that parents tend to visit infrequently, but newer studies report more regular parental visiting patterns.3-7

Parental visitation has been shown to be associated with demographic factors. Parents’ low socioeconomic status, parents’ not living together, and a child with a birth order of 2 or higher have been shown to be associated with less frequent visits.8 Mothers have been found to visit more often than fathers.3,4 Infrequent visitation has been associated with poor outcome. Fanaroff et al9 showed in their study, conducted in NICU settings of the 1960s, that a low visiting frequency (less than 3 visits per 2 weeks) at NICUs by mothers of low-birth-weight infants was associated with a poor outcome, including abandoning, battering, nonorganic failure to thrive, or foster care. It is not known whether small differences in the current visiting frequencies contribute to later behavioral and emotional problems of preterm infants.

Author Affiliations: Department of Child Psychiatry, University of Tampere and Tampere University Hospital, Tampere (Drs Latva and Tamminen), Department of Pediatrics, Turku University Hospital, Turku (Dr Lehtonen), and School of Public Health, University of Tampere, Tampere (Dr Salmelin), Finland.

©2004 American Medical Association. All rights reserved.

Downloaded From: http://archpedi.jamanetwork.com/pdfaccess.ashx?url=/data/journals/peds/12007/ on 06/25/2017
Our aim was to study the long-term effects of parents’ visiting frequency during the NICU period on the later behavioral and emotional problems of the child.

METHODS

The study was conducted at the Tampere University Hospital in Tampere, Finland, in 1996-1997. Data were retrospectively collected from the hospital records of the mother and the infant, including the parental visits to the NICU. The behavioral and emotional problems of the child were evaluated by questionnaires in spring 1997, when the children were at the age of 7 to 8 years, corresponding to the completion of the first grade of school in Finland. We decided to study this age group because starting school is one of the important turning points in the life of a child. Possible vulnerability, especially to separation anxiety, may be manifested as behavioral and emotional problems in this life situation. The study has been approved by the Pirkanmaa Hospital District’s ethics committee.

The study population consisted of all premature infants who were born in the Tampere University Hospital in 1989, who were admitted to the NICU from the delivery room, and who lived in the Tampere region (N=79). Prematurity was defined as birth weight of less than 2500 g and/or gestational age of less than 37 weeks. Only those infants who were capable of attending regular school at 7 years of age were included. This criterion excluded 8 disabled children. In addition, 3 children had died, and 1 child was excluded from the study because she had recently lost her mother. Of the study population, 67 children (31 boys and 36 girls) met the inclusion criteria, and their parents received the questionnaires. Forty-eight (72%) of the questionnaires were returned. One of them was incomplete and therefore excluded. The mothers sent informed consent forms for the study with the questionnaires. There were no significant differences between the visiting frequencies of the parents who returned the questionnaires and those who did not. In the sample, there were 8 sets of twins, 5 of which were intact and in which both children met the inclusion criteria. From these children, 4 pairs were discharged from the hospital at the same time. In 3 pairs, a twin brother or sister died during the neonatal period. In the sample, there was also 1 set of triplets in which only 1 child met the inclusion criteria and was accepted for the study; the other 2 children were excluded from the study because they were not admitted to the NICU in the neonatal period.

The data collected from the hospital records of each infant included birth weight and height, gestational age at birth, diagnoses, Apgar scores, and the following data concerning the medical care in the NICU: the length of the NICU period, the length of stay in the incubator, the duration of ventilator treatment and supplementary oxygen, and the duration of intravenous fluids and tube feeding. The data collected from the hospital records of the mother included maternal age, profession, marital status, and previous pregnancies. The socioeconomic status of the parents was based on their professions and divided into 7 categories according to the classification of the Central Statistical Office of Finland: self-employed persons; upper-level employees with administrative, managerial, professional, and related occupations; lower-level employees with administrative and clerical occupations; manual workers; students; pensioners; and others. The socioeconomic status of the family was considered to be that of the mother or the father, whichever was higher. For purposes of the analysis, 2 categories were used, the upper class composed of the first 3 categories, the rest of the categories falling into the lower class.

Data of the visits of the mother and the father were collected from the hospital records of the infant. The NICU of the Tampere University Hospital had an unrestricted visitation policy for the parents and siblings. The NICU nurses documented all visits of the parents in every 3-hour period as part of nursing charting. Complete hospital records were available for every infant, and the notes were clearly made.

The Child’s Behavioral Checklist (CBCL)10 questionnaires were mailed to the children’s mothers. The CBCL is an internationally used and standardized questionnaire developed to screen children’s behavioral and emotional problems and disorders. For this study, we used the part of the questionnaire assessing behavioral and emotional problems, excluding items for social competence. This part contains 118 items and 2 open-ended questions for the parents to report possible concerns. The items were graded as 0 (not true), 1 (somewhat or sometimes true), or 2 (often true or very true). The raw sum scores across all items were converted into normalized T scores based on percentiles of normative samples of children standardized for different age and sex groups. The normative data were obtained from the US national sample.10 However, cross-cultural comparisons have yielded relatively small differences in the rates of behavioral and emotional problems and syndrome structure.11 The children were divided into 3 groups: normal cases (T score under 60), borderline cases (T scores 60-63), and clinical cases (T score over 63). The normal procedure when using the CBCL without clinical evaluation of the child is to include the borderline and clinical cases in the analysis.10

Because of the wide variation in the length of NICU periods, the parental visiting frequencies for each child were calculated as proportionate to the length of the respective NICU period. Thus, the number of parental visiting days per week is reported. The resulting values were rounded to integers.

The material was described by simple frequencies as well as means and standard deviations of medians and quartiles, as appropriate. First, the associations of the dependent variable and the independent variables of interest were examined pairwise by cross-tabulations (χ² as a significance test). The categorizations of the variables were performed in such a manner that they took into account the variability of the variables and gave suitable cell-sizes for calculations. In some cases, this resulted in different cut-off values for similar variables (eg, the mother’s visiting frequency per week being 0-6 and 7, the father’s being 0-4 and 5-7). To investigate the simultaneous effects of variables, logistic regression analysis was applied. The pairwise analyses were accomplished with the SPSS package versions 6.0 and 11.0 for Windows (SPSS Inc, Chicago, Ill). For the logistic regression analysis, the LogXact program version 4 (CYTEL Software Corp, Cambridge, Mass) was used because its exact method is the most suitable one for a small number of cases.

In the final study sample, there were 23 (49%) boys and 24 (51%) girls. The mean±SD age of the mothers was 29±5 years (range, 20-44 years) when the child was born. Two percent of the mothers were self-employed persons, 10% were upper-level employees, 65% lower-level employees, and 23% manual workers. Of the fathers, 29% were upper-level employees, 33% lower-level employees, 35% manual workers, and 2% students. More than half (55%) of the mothers were married, and 89% were married or living in common-law marriage at that time. Sixty-six percent of the mothers did not have other children, 23% of the mothers had 1 child, and the rest had 2 or more children.
Mothers visited the NICU on average 6.2 days (range, 2.3-7.0 days) per week, whereas fathers visited on average 4.7 days per week (range, 1.8-6.6 days). Twenty-eight percent of the mothers visited their infants in the NICU every day. Only 2% of the fathers visited their infants 7 days per week. The number of the parents’ visits was independent of the sex of the infant. The visiting frequency of the parents was also independent of the length of the NICU period of the infant (Figure 1). The length of periods when neither of the parents visited ranged from 0 to 7 days. We wanted to examine if the existence of nonvisiting days by the mother affected the child’s behavioral and emotional development. Therefore, we divided the families into those whose mothers visited daily and those with less frequent maternal visits. There were no significant differences in the demographic and infant factors between these groups (Table).

According to the CBCL, clinical behavioral and emotional problems were found in 6 and borderline problems in 4 of 47 children (13% and 9%, respectively). There were no statistically significant differences between girls and boys in the parental assessment.

All of the children with borderline or clinical CBCL scores had experienced nonvisiting days by their mothers. None of the children whose mothers had visited daily had behavioral and emotional problems according to CBCL ($P=.04$) (Figure 2). There was no statistically significant association between the visiting frequency of the father and the child’s subsequent emotional and behavioral problems.

Logistic regression analysis used to find the strongest factors affecting CBCL was completed in 2 stages to reduce the number of independent variables per analysis. The reliable and contextually reasonable, non-normally distributed independent variables were categorized appropriately as suggested by the cross-tabulations and divided into 4 blocks (2 for the infant, 1 for the mother and the family, and 1 for the NICU period). First, a separate stepwise logistic regression analysis was completed for each block. Second, the variables with $P$ values less than the removal limit of .10 were entered into the final model. Mother’s daily visiting offered protection for high CBCL scores as compared with less frequent visits (odds ratio, 0.2; $P=.07$; 95% confidence interval, 0.8-46.9). Mother’s age remained in the model as a non-significant factor. The blocks including gestational age and birth weight of the infant were insignificant and were removed from the model.

### Table. Demographic Factors of the Family and Factors of the Infants in the Groups of Mothers Visiting Daily and Mothers Visiting Less Than Daily*

<table>
<thead>
<tr>
<th>Demographic factors</th>
<th>Every Day</th>
<th>Less Than Every Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of the mother, y†</td>
<td>31 (26, 34)</td>
<td>28 (25, 30); 20-42</td>
</tr>
<tr>
<td>Socioeconomic status of the family‡</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Upper</td>
<td>85</td>
<td>83</td>
</tr>
<tr>
<td>Marital status, %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>58</td>
<td>67</td>
</tr>
<tr>
<td>Unmarried</td>
<td>42</td>
<td>33</td>
</tr>
<tr>
<td>Birth order of the infant, %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firstborn</td>
<td>62</td>
<td>69</td>
</tr>
<tr>
<td>Later born</td>
<td>38</td>
<td>31</td>
</tr>
<tr>
<td>Factors of the infant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex of the infant, %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boy</td>
<td>46</td>
<td>49</td>
</tr>
<tr>
<td>Girl</td>
<td>54</td>
<td>51</td>
</tr>
<tr>
<td>Gestational age, completed weeks‡</td>
<td>35 (32, 35)</td>
<td>35 (33, 36); 27-36</td>
</tr>
<tr>
<td>Birth weight, g†</td>
<td>2020 (1410, 2475); 1500-2730</td>
<td>2060 (1525, 2290); 700-3160</td>
</tr>
<tr>
<td>Duration of the ventilator treatment, d†</td>
<td>0 (0, 3); 0-28</td>
<td>0 (0, 0); 0-48</td>
</tr>
<tr>
<td>Duration of supplemental oxygen, d†</td>
<td>2 (2, 9); 0-25</td>
<td>2 (0, 2); 0-32</td>
</tr>
<tr>
<td>Length of stay in the incubator, d†</td>
<td>12 (4, 21); 0-41</td>
<td>6 (4, 13); 0-68</td>
</tr>
<tr>
<td>Length of stay in the NICU, d†</td>
<td>24 (17, 35); 15-60</td>
<td>20 (10, 29); 4-99</td>
</tr>
</tbody>
</table>

**Abbreviation:** NICU, neonatal intensive care unit.

* $P$ values were not significant.
† Data presented as median (lower quartile, upper quartile); range.
‡ Two categories were used, the upper class comprising self-employed persons and upper-level and lower-level employees and the lower class comprising manual workers, students, pensioners, and others.

Figure 1. The association between the length of hospital stay of the infants (n=47) and the number of days the mothers visited them in the neonatal intensive care unit (NICU).

This study shows that the frequency of the mother’s visits to the NICU was associated with the long-term behavioral and emotional development of the child. Specifically, daily visits by the mother were associated with fewer behavioral and emotional problems at 7 years of age. The impact of the mother’s visits was stronger than the impact of gestational age, birth weight, or the medical risks of the infant.

In this study, mothers and fathers visited the NICU more often than in previous studies. The documenta-
tion of their visits in the medical records was accessible and meticulously noted. There may be various causes for the higher parental visitation frequency. The improved survival of premature infants has encouraged parents to participate and has obviously affected parental visits to the NICU. The parental visiting in this study may also be influenced by such background factors as a homogeneous population and a high educational level in Finland, a low rate of teenage pregnancies (none of the mothers in our study was younger than 20 years), a low rate of single parenting (11%), and a small family size (65% of the infants studied were firstborn). The visiting frequency and its impact may be different in countries with more heterogeneous populations and with lower parental visiting frequencies, and, therefore, our results may not be generalizable in such cases.

A limitation of our study is the relatively small size of the study group. Visiting frequency, however, seems to have a robust influence on child development because it emerged as a significant factor despite the small study groups. Although a low rate of participation was related to the long-term behavioral and emotional development of the child, we could not demonstrate the same for the fathers because the hospitalization may complicate the start of the early interaction. Frequent parental visits could promote the normal attachment to their mothers and fathers,13 which is a key factor in the mental development of the low-birth-weight infant and for a nonoptimal mother-infant relationship.13 On the other hand, the visitation frequency may not be just an indicator of underlying problems. Early separation negatively affects the mother-infant relationship, which is a key factor in the mental development of the child. In mother-infant interaction, both mother and infant are active participants from the time of the birth of the infant, and the important attachment relationship develops during the first year of the infant's life. The infant wishes to maintain proximity to the parent, seeks security and comfort from the relationship, and feels distress at involuntary separation. In earlier studies, preterm infants did not appear to be at risk for severely abnormal attachment to their mothers and fathers. However, in more recent studies, extremely preterm infants have been shown to have an unusually high amount of atypical attachment patterns. The latest attachment and developmental studies in the neurosciences provide new support for the idea that there may be different sensitive periods for human interaction in early child development.

In conclusion, frequent parental visits seem to be an excellent marker for the normal development of the later mental health of a preterm infant. A separation caused by hospitalization may complicate the start of the early interaction. Frequent parental visits could promote the development of the parent-child relationship. The lack of daily visits by the mother provides a simple and inexpensive indicator of a group of children at an increased risk for subsequent behavioral and emotional problems. This group is therefore in need of support and follow-up. In the future, intervention studies could tell us whether modification of parental visiting frequency would change parent-child interaction and child development.

Accepted for Publication: June 11, 2004.
Correspondence: Reija Latva, MD, Department of Child Psychiatry, University of Tampere, FIN-33014, Tampere, Finland (reija.latva@uta.fi).
Funding/Support: This study was supported by the Emil Aaltonen Foundation, Tampere, Finland, and the Finnish Child Psychiatry Research Foundation, Kuopio, Finland.

What This Study Adds

Although early separation has been suggested to have a negative effect on the development of the parent-child relationship, the role of parental visiting frequency in neonatal units has not been studied with regard to the later behavioral and emotional development of the preterm infant. Our study shows that daily visits by the mother to the neonatal intensive care unit were associated with fewer behavioral and emotional problems in the child. The lack of daily visits by the mother provides a simple indicator of a group of preterm infants who are at an increased risk for subsequent behavioral and emotional problems and in need of support and follow-up.

![Graph: Visiting Frequency in NICU, Days/Week](http://archpedi.jamanetwork.com/pdfaccess.ashx?url=/data/journals/peds/12007/ on 06/25/2017)
REFERENCES