Attachment disorganization among children in Neonatal Intensive Care Unit: Preliminary results

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ABSTRACT

Background: Preterm children have been reported to be at higher risk to develop attachment insecurity.
Aims: The present study aimed to investigate potential differences in attachment security between newborns who were sent to Neonatal Intensive Care Unit (NICU) and those who were not, in a population of full-term children.
Study design: Participants (162 mother–child dyads) were part of a longitudinal study (MAVAN). Twenty-three of these children received special care at birth (NICU group). Attachment security was assessed at 36 months with the Strange Situation Procedure. Socio-economic status (SES), birth weight, maternal mood, maternal sensitivity, mental/psychomotor developmental indexes, Apgar scores, presence of complications during delivery and infant general health were assessed.
Results: In the No-NICU group, 55.4% of children were securely attached, 24.5% were insecure and 20.1% were disorganized. However, in the NICU group, 43.5% of children were securely attached, 8.7% were insecure and 47.8% were disorganized ($\chi^2 = 9.0$; $p = .01$). The only differences between the 2 groups were a lower Apgar, more respiratory infections and more visits to walk-in clinic/hospital (p's < .05) and a trend for lower SES and more ear infections in the NICU group. Logistic regressions revealed an odds ratio of 6.1 ($p = .003$) of developing a disorganized attachment after a stay in NICU, when controlling for these confounding variables.
Conclusion: Newborns who were admitted to NICU have an odds ratio of about 6 to develop a disorganized attachment at 36 months. These preliminary results support the importance of supportive parental proximity and contact with the infant in the NICU and possible after-care.

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1. Introduction

Attachment is described as the emotional and enduring bond between infant and the caregiver [1–3]. Securely attached children are able to use their attachment figure as a haven of safety and a secure base to explore the environment contrary to insecurely attached children [4]. Insecure-avoidant children tend to avoid proximity to their mothers and minimize the expression of their negative emotions [4,5], whereas insecure-ambivalent children show resistance as well as dependence toward their attachment figure [4,6]. Secure, ambivalent and avoidant infants are considered to show organized attachment strategies in the sense that they have developed a consistent, coherent, behavioral strategy which is adaptive for relationship continuity with their parental figure. However, a fourth group of infants have been identified, who show *disorganized* attachment, i.e. they fail to show an organized strategy for seeking proximity to the attachment figure in times of distress [7]. These infants display bouts or sequences of behaviors that seemingly lack a goal and often appear contextually bizarre and incoherent. Children showing disorganized attachment have the highest risk among all attachment groups for later psychopathology [8,9].

Although still controversial, preterm children, particularly those with neurological impairment, have been reported to be at risk for dysfunctional attachment relationships [10,11]. Although the majority of studies do not show a higher proportion of insecure vs. secure attachment in preterm samples [11–13], a recent study has shown a higher prevalence of disorganized attachment in preterm as compared to

full-term children [10]. Neurodevelopmental problems associated with preterm birth have been proposed to explain this association. Disorganized attachment is present in about 35% of infants with neurological abnormalities in comparison to 15% in community samples [14].

In addition to the risk of developmental impairments, environmental factors i.e. the separation and the lack of supportive physical contact between parents and infants following preterm birth could also contribute to the association between preterm birth and disorganized attachment [15]. Early separation between the infant and the mother has been linked to increased parental stress [16]. In addition, parents of preterm infants may experience emotional detachment and feelings of helplessness at moments of high infant distress, such as during invasive medical procedures. These parental states, which have been linked to problems in parental responsiveness, have been shown to predict disorganization in infants [17,18].

To our knowledge, no study has specifically examined the association between NICU experience following birth and the development of child attachment, without the confounding effect of prematurity. Therefore, the aim of the present study was to investigate whether there were differences in attachment security between children who received special care at birth (Neonatal Intensive Care Unit (NICU) and/or incubator; NICU group) and children who did not (No-NICU group), in a population of full-term children.

2. Method

2.1. Subjects

One hundred sixty-two mother–child dyads were included in the study. Subjects were part of the Maternal Adversity, Vulnerability and Neurodevelopment (MAVAN) study, a longitudinal study designed to measure the influence of the environment on infant development. Mothers were recruited during pregnancy, between 13 and 20 weeks of gestation, from obstetric clinics in Montreal, Québec and Hamilton, Ontario (Canada). Inclusion criteria were age 18 years and over and fluency in English or French. Women with serious obstetric complications, chronic illness, congenital diseases or any other serious medical conditions were excluded. Babies with serious complications during delivery or serious medical conditions were excluded as well. To eliminate the contribution of premature birth, infants born at ≤37 weeks of gestation were excluded. All subjects signed a consent form approved by the ethics committee of the Douglas Mental Health University Institute (McGill University, Montreal) and St-Joseph Healthcare (McMaster University, Hamilton).

2.2. Data collection

The modified separation–reunion procedure described by Cassidy and Marvin with the MacArthur Working Group on Attachment (1992) for preschool-age children was measured at 36 months [19]. It consists of four episodes lasting 5 min each: (a) separation between mother and child; (b) reunion; (c) second separation; and (d) second reunion. During both separations, the child was left alone. Following the separations, the mother was told to rejoin the child but received no specific instructions concerning the reunions. The separation–reunion sequence took place in a room in which age-appropriate toys were scattered. The attachment classifications (secure, avoidant, ambivalent, disorganized) were based on behavior observed in both reunions, with details of coding criteria for each classification provided in Moss, Bureau, Cyr, Mongeau & St-Laurent [20]. Coding is based on information gathered from five modalities: physical proximity and contact, body positioning, speech, gaze and affect. The validity of this procedure for classifying attachment behavior in children of this age range has been demonstrated in several studies [8,20]. Two trained observers, who had achieved reliability with experts on a separate set of tapes, coded

the videotapes and achieved strong interrater agreement (89%, κ = 0.83) on a subsample of 20% of the tapes.

Birth weight percentile, maternal mood at 6 and 36 months (Center for Epidemiologic Studies Depression Scale, CES-D [21]), maternal anxiety at 24 months (State/Trait Anxiety Inventory; STAI [22]), mental and psychomotor developmental indexes at 6, 12, 18 and 36 months [23] and maternal sensitivity at 6 months (Ainsworth Scales [4]) were assessed. Again, two trained observers coded the maternal sensitivity videotapes. Fourteen tapes were double-coded and they yielded intraclass correlation of .88 ($p < .0005$). Socio-economic status (SES) was based on maternal education and household income (low income cut off of Statistics Canada after tax and adjusted for the number of persons in the family). SES was broken into three categories: High SES (high income–high mother education); middle SES (low income–high mother education or high income–low mother education; and low SES (low income–low mother education). Mothers were also asked to report any complications during delivery and Apgar scores at 1 and 5 min postpartum were collected. The following question was used to determine whether the infant had been admitted into the NICU: "Did your baby receive any special care at birth (incubator, neonatal intensive care)?".

To evaluate the potential impact of general health condition, the child's health was assessed at 36 months. Mothers were asked if their child suffered from asthma, anemia, gastro-intestinal infections, ear infections or respiratory tract infections with fever during the last 6 months. They were also asked if their child suffered from an injury, visited the emergency ward of a hospital or a medical clinic without appointments or was admitted to a hospital overnight during the last 6 months. Finally, mother's perception of infant health was measured with the following question "In general, would you say that the health of your baby is…" and mothers responded on a 5-point scale (1 = excellent, 5 = not good).

2.3. Statistical analyses

Chi-square tests were used to assess the relation between NICU and attachment. T-tests or chi-square tests were used to assess differences between the NICU and No-NICU groups with regard to SES, birth weight percentile, maternal mood, maternal anxiety, maternal sensitivity, mental and psychomotor developmental indexes, complications during delivery, Apgar scores and questions related to infant health. Logistic regressions were conducted to estimate the probability of having any given attachment pattern as a function of NICU, controlling for factors that were statistically different between the NICU and No-NICU groups. Statistical analyses were conducted using *IBM SPSS Statistics 20*. For all tests conducted, the significance level was set at $p < .05$.

3. Results

3.1. Preliminary analyses

Of the 162 children, 23 children (14.2%) received special care at birth (incubator and/or neonatal intensive care) (NICU group) whereas 139 (85.8%) did not receive any special care (No-NICU group). Overall, 87 (53.7%) were securely attached, 7 (4.3%) were classified as insecure-avoidant, 29 (17.9%) were classified as insecure-ambivalent and 39 (24.1%) were disorganized. Considering the low percentage of avoidant children, ambivalent and avoidant children were pooled, given that these two categories are both insecure and organized forms of attachment.

3.2. Main analyses

In the No-NICU group, 55.4% of children were secure, 24.5% were insecure (ambivalent or avoidant) and 20.1% were disorganized. However, in the NICU group, 43.5% of children were securely attached, 8.7%