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Maternal postpartum depressive symptoms predict delay in non-verbal communication in 14-month-old infants

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ABSTRACT

We investigated the potential relationship between maternal depressive symptoms during the postpartum period and non-verbal communication skills of infants at 14 months of age in a birth cohort study of 951 infants and assessed what factors may influence this association. Maternal depressive symptoms were measured using the Edinburgh Postnatal Depression Scale, and non-verbal communication skills were measured using the MacArthur-Bates Communicative Development Inventories, which include Early Gestures and Later Gestures domains. Infants whose mothers had a high level of depressive symptoms (13+ points) during both the first month postpartum and at 10 weeks were approximately 0.5 standard deviations below normal in Early Gestures scores and 0.5–0.7 standard deviations below normal in Later Gestures scores. These associations were independent of potential explanations, such as maternal depression/anxiety prior to birth, breastfeeding practices, and recent depressive symptoms among mothers. These findings indicate that infants whose mothers have postpartum depressive symptoms may be at increased risk of experiencing delay in non-verbal development.

1. Introduction

Human communication skills develop dramatically during infancy, with recent literature highlighting the importance of non-verbal communication skills (e.g. gestures), versus verbal communication skills (e.g. language), during the earliest stages of life. Specifically, emergence and development of non-verbal communication skills is predictive of and succeeded by development of verbal communication skills (Alexander Pan, Rowe, Spier, & Tamis-Lemonda, 2004; Bates & Dick, 2002; Bavin et al., 2008; Reilly et al., 2006; Reilly et al., 2010), implying that "gesture paves the way for language development" (Iverson & Goldin-Meadow, 2005). Accordingly, delayed development of non-verbal communication skills has been suggested

Abbreviations: CDI, the MacArthur-Bates Communicative Development Inventory; DSM-IV-TR, the Diagnostic and Statistical Manual of Mental Disorders, 4th edition, Text Revision; EPDS, Edinburgh Postnatal Depression Scale; HBC Study, the Hamamatsu Birth Cohort for Mothers and Children; SCID-I, the Structured Clinical Interview for DSM-IV Axis I Disorders.

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to be associated with poor language development in later life (Brignell et al., 2016) as well as a range of neuropsychiatric conditions (Chartrand & Lakin, 2013; Galeote, Sebastian, Checa, Rey, & Soto, 2011; Kjellmer, Hedvall, Fernell, Gillberg, & Norrelgen, 2012; Luyster, Seery, Talbott, & Tager-Flusberg, 2011; Stone, McMahon, Yoder, & Walden, 2007; Zwaigenbaum, Bryson, & Garon, 2013). These studies have thus implied the utility of non-verbal communication skills as a milestone for accurate prediction and better understanding of trajectories of a range of developmental domains. However, details regarding infant populations most at-risk for delayed development in non-verbal communication skills remain unclear. The primary aim of this study is to explore predictors of delayed development in non-verbal communication skills.

Potential sociodemographic predictors of these population, i.e. infants with delayed non-verbal communication skills have been reported in literature, including male gender (Reilly et al., 2006), non-Caucasian ethnicity (Tamis-LeMonda, Song, Leavell, Kahana-Kalman, & Yoshikawa, 2012), and low maternal education (Rowe & Goldin-Meadow, 2009). Beyond the aforementioned studies examining sociodemographic predictors, maternal predictors of a child's non-verbal communication skills has not been well understood. In early years of research, gestures and imitations have been discovered to start soon after birth and thought to be responses to maternal actions (Meltzoff & Moore, 1977, 1992), suggesting that maternal responsivity is a key to facilitate non-verbal communication of infants. Recent studies added to this and suggested that "baby sign program" or gesture training may influence on responsiveness of mothers (Kirk, Howlett, Pine, & Fletcher, 2013; Vallotton, 2009). Conversely, if maternal responsivity is decreased due to some reasons, this may hinder facilitation of non-verbal communication skill. Maternal depressive symptoms after childbirth, commonly referred to as postpartum depression, are therefore of interest in this regard, as such symptoms are likely to decrease responsivity to the child and thus to affect child development both psychologically and biologically (Apter-Levy, Feldman, Vakart, Ebstein, & Feldman, 2013; Conroy et al., 2012; Keim et al., 2011; Kingston, Tough, & Whitfield, 2012; Koutra et al., 2013; McManus & Poehlmann, 2012; Nasreen, Kabir, Forsell, & Edhborg, 2013). Of clinical note, maternal depressive symptoms after childbirth are known to be one of the most prevalent psychiatric manifestations among women, noted in some 10% to 20% of women after childbirth (Gavin et al., 2005; O'Hara & McCabe, 2013). Further, maternal depressive symptoms after childbirth have been reported to be predictive of infants' language delay (Brennan et al., 2000; Quevedo et al., 2012). In this regard, one can suspect if maternal depressive symptoms also confer risk for delayed development, possibly in 1 per 10 to 5 infants' non-verbal communication skills.

Here, we examined the association between maternal depressive symptoms, measured during the first month and 10 weeks after childbirth, and infants' development of non-verbal communication skills, measured at 14 months of age using the MacArthur-Bates Communicative Development Inventories (CDI; Fenson et al., 2007), translated and validated in Japanese (Ogura & Watanuki, 2004). Any association, if confirmed, would then be investigated to determine what factor underlies this association.

2. Methods

This study was conducted as part of the ongoing hospital-based birth cohort study, the Hamamatsu Birth Cohort for Mothers and Children (HBC Study), the details of which has been described elsewhere (Takagai et al., 2016; Tsuchiya et al., 2010). Briefly, participants were mothers and their newborn infants, with mothers enrolled during pregnancy and infants enrolled at birth, both to be followed-up until the child was approximately 10 years of age. On comparison with official national statistics, our subjects were shown to be representative of mothers and infants in Japan in terms of socioeconomic status, parity, birth weight, and gestational age at birth (Takagai et al., 2016; Tsuchiya et al., 2010).

2.1. Ethical considerations

The study was conducted in accordance with the guidelines proposed in the World Medical Association Declaration of Helsinki and has been approved by the Medical Ethical Committee of Hamamatsu University School of Medicine, Japan (No. 20–82, 21–114, 22–29, 24–67, 24–237, 25–143, 25–283, E14-062). Full written informed consent for the study was obtained from participating parturients for both parent and child data.

2.2. Participants

In the framework of HBC Study, we consecutively contacted all pregnant women who were expected to give birth at either of our two research sites—Hamamatsu University Hospital and Kato Maternity Clinic, both situated in Hamamatsu City—between December 1, 2007, and November 30, 2011. For the present study, the parturients were followed up from mid-pregnancy, when they were approached to enter the study (between the 14th and 26th week of gestation), to 14 months after childbirth. Infants to whom the parturients gave birth were also followed up from birth to 14 months of age in the present study. Of the 1064 infants followed-up until 14 months of age, 113 (11%) were excluded for missing their examination at the age of 14 months due to difficulties in visiting our research site, and so the remaining 951 were investigated in our study.

Comparison of the 113 excluded participants and 951 participants to be analysed showed no significant differences between the two groups in terms of annual household income, years of maternal education, or infants' gestational age at birth, gender, birth order, or twin births (no multiple births other than twins occurred). Only mean mother's age (but not mother's partner's age) was significantly younger among excluded participants than analysed participants (30.1, standard deviation [SD] 5.0 vs. 31.8, SD 5.1 years; $t = 3.21$, $df = 1062$, $p < 0.001$).