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Maternal prenatal psychological distress and temperament in 1–4 month old infants – A study in a non-western population

Amritha Bhat[a,*], Roopashree Chowdayya[b], Sumithra Selvam[b], Arif Khan[c,d], Russell Kolts[e], Krishnamachari Srinivasan[b,f]

[a] University of Washington, Seattle, WA, United States
[b] St. John's Research Institute, Bangalore, India
[c] Northwest Clinical Research Center, Bellevue, WA, United States
[d] Duke University Medical Center, Durham, NC, United States
[e] Eastern Washington University, Cheney, WA, United States
[f] St. John's Medical College Hospital, Bangalore, India

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ABSTRACT

In this longitudinal study, conducted in women attending antenatal visits at the obstetrics and gynecology clinic of a general hospital in Bangalore, India, we aimed to assess the relationship between prenatal distress in mothers, and maternal report of infant temperament at four months. 100 mothers with normal full term deliveries completed the General Health Questionnaire-28 item version (GHQ) in the third trimester and postnatally. Salivary cortisol and temperament (using the Early Infancy Temperament Questionnaire – EITQ) were assessed in their infants aged 1–4 months. In this study, maternal prenatal psychological distress was not significantly associated with maternal report of difficult temperament in infants. Infants of mothers who were a negative screen for psychological distress (GHQ < 7), $n = 85$ had higher scores on the adaptability and approach dimensions of temperament. Infant salivary cortisol was significantly higher in infants with higher intensity scores. These results introduce the possibility of cultural differences in the relationship between prenatal distress in the mother and infant temperament. These could be factors linked to child rearing practices or to the measures employed to study infant temperament. These findings derive from a small sample with few mothers with psychological distress, and need replication in a larger sample.

1. Introduction

Maternal prenatal anxiety or depression is associated with various adverse infant outcomes including preterm birth and low birth weight (Hobel, 2004), and behavioral/emotional problems in childhood (Patel & Prince, 2006) and even as late as into adolescence (Pearson et al., 2013). One less frequently discussed association is that between maternal prenatal anxiety or depression and infant difficult temperament (Lundy et al., 1999). This outcome is especially significant as difficult temperament and maternal distress are mutually reinforcing. It is difficult for a mother, especially a mother with depression/anxiety to interact sensitively with an infant with a difficult temperament. Although it remains difficult to separate

* Corresponding author at: 1959 NE Pacific Street, Box 356560, Seattle, WA 98195-6560, United States. Tel.: +1 2063142959.
E-mail address: amritha@uw.edu (A. Bhat).

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genetic from environmental influences, there appears to be a link between parental psychopathology and offspring temperament, and further, a link between offspring difficult temperament and lifetime psychopathology (Mufson, Nomura, & Warner, 2002). Mother–infant interaction is a mediating or moderating factor in this association and can be a focus of early interventions.

Hence it becomes important to delineate the relationship between maternal psychological distress and infant temperament. Coplan, O'Neil, and Arbeau (2005) examined the differential effects of maternal state and trait anxiety on infant temperament. They found that maternal trait anxiety was positively correlated with infant distress to limitations and negatively correlated with infant soothability. After controlling for trait anxiety, maternal prenatal state anxiety was associated with less positive infant affect and lower attention span. Henrichs et al. (2009) found that maternal general pre and postnatal anxiety was associated with higher activity level, more distress to limitations and more sadness in infants. In a cohort study including 1353 dyads, (Melchior et al., 2012) maternal prenatal depression was found to be associated significantly with higher infant emotionality as measured on the 20 item EAS temperament scale. Huizink, de Medina, Mulder, Visser, and Buitelaar (2002) found that pregnancy specific anxiety and perceived stress were related to a decrease in attention regulation.

There are, however, very few studies of the effect of maternal prenatal psychological distress on infant temperament reported in non-western populations. It has been previously reported that there are cross-cultural differences in the development of temperament (Gartstein et al., 2006). Culture specific views on child rearing, household stability, presence of nuclear or extended families, child care issues, all may influence the interaction between maternal psychological distress and infant temperament.

Mechanisms for the link between maternal prenatal stress and infant behavioral/emotional problems are not clear but could include early programming of the hypothalamo–pituitary axis (Meaney et al., 1993). Maternal anxiety and stress during pregnancy can lead to increased maternal production of cortisol which could influence the developing fetal HPA axis (Gitau, Fisk, Teixeira, Cameron, & Glover, 2001). Maternal sensitivity, as observed during a play interaction, has also been found to be associated with lower baseline cortisol levels in infants (Blair, Granger, Willoughby, & Kivlighan, 2006) and salivary cortisol has been used as a measure of stress response in infants and young children (Lewis & Thomas, 1990).

In this study we examined the association between maternal prenatal psychological distress and temperament in infants aged 1–4 months old in full term normal birth weight infants in a non-western population. We also studied the association between salivary cortisol and temperament in infants. We chose to study infants 1–4 months old because early detection of difficult temperament and subsequent intervention would be more meaningful in this age group, especially in preventing the mutually reinforcing negative influences of maternal depression and difficult infant temperament. We hypothesized that maternal prenatal psychological distress would be correlated with difficult infant temperament. We also hypothesized that salivary cortisol levels in infants, as a marker of HPA function would be associated with specific dimensions of infant temperament such as intensity, adaptability and mood.

2. Methods

This study was part of a prospective cohort study, focusing on maternal nutrition and birth outcomes at St. John's Medical College Hospital, Bangalore, India (Muthayya et al., 2006). The Institutional Ethical Review Board at St. John's Medical College Hospital approved all study procedures, and written informed consent was obtained from each study subject at enrollment.

2.1. Participants

Pregnant women attending routine antenatal checkup at the Obstetrics and Gynecology outpatient department of St. John's Medical College Hospital and anticipating delivery at St. John's Hospital were invited to participate in the study. Inclusion criteria were: singleton pregnancy, no pregnancy-induced hypertension or gestational diabetes in the current pregnancy, no maternal use of alcohol/drugs or smoking, and full term infants (37 or greater weeks in gestation) with normal birth weight (above 2500 g). Women infected with blood borne diseases (i.e. positive for hepatitis B surface antigen – HbSAg, HIV or syphilis) were excluded from the study. All pregnant women (for a total of 100 subjects) who met these criteria and whose infants were between 1 and 4 months age were included.

2.1.1. Characteristics of the mothers

The mean maternal age was 24.2 years (SD = 3.7) and all were married. The majority of the mothers had 6–10 years of school education ($n = 65$; 65%) with 21% ($n = 21$) college graduates and 12% ($n = 12$) had postgraduate degrees. Two subjects had no formal education. A total of 15% were employed and 85% were homemakers; however at the time of rating temperament all mothers were still on maternity leave and were the infants' primary caregivers. 80% of the mothers had a normal vaginal delivery. Of the 100 mothers, 85 mothers completed the GHQ during the follow up visit with their infants at 1–4 months and 15 mothers refused to do so.