



## **Prenatal/Perinatal Stress and Its Impact on Psychosocial Child Development**

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*(Published online June 3, 2002)*

### **Topic**

*Stress (prenatal and perinatal)*

### **Introduction**

From time immemorial, there have been stories about the effect of a mother's emotions on a developing foetus. The belief that a foetus may be harmed by negative maternal emotions related to stress and anxiety has its roots in cultural tradition and folklore that span the globe. A significant amount of scientific inquiry has attempted to determine the validity of such beliefs by examining the manner in which maternal stress and anxiety may be related to pregnancy outcomes and postnatal development in children.<sup>1-6</sup>

### **Subject**

It has been purported that maternal stress during pregnancy acts as a developmental teratogen (a substance that can negatively affect development) as can be the case with drugs or alcohol. Articles in magazines and newspapers often perpetuate this belief, thus (ironically) exacerbating stress in pregnant women, who may be unable to control difficult life circumstances. This report will provide a review of evidence in the debate regarding whether or not maternal stress during pregnancy causes poor developmental outcomes in children.

### **Problems**

Measuring and defining stress is a complicated undertaking. A woman's appraisal of whether something is stressful is affected by many factors, including aspects of her personality, such as her anxiety level and outlook on life. Objectively speaking, a woman who reports a great deal of stress during pregnancy may not be experiencing a more stressful time than any other woman. She may simply be more susceptible than other women to negative or passionate reactions when confronted with minor, daily hassles. It is therefore difficult to distinguish stress from other psychological or personality characteristics. Indeed, it is worth noting that implications for prevention and policy will differ based on whether the sources of stress are perceived as internal or external to the pregnant woman.

### **Research Context**

There are many reasons why we might expect a mother's emotional state could affect her foetus. A woman's thoughts are not transmitted to the foetus because there are no direct neural connections between them, but maternal stress and emotions produce a cascade of hormonal reactions and changes in blood flow to the uterus that directly influence the intrauterine milieu. In fact, given the intricate physiological relationship between mother and foetus, it would be somewhat surprising if the state of the maternal "womb environment"<sup>7</sup> did **not** serve to shape foetal development. The most conclusive evidence in this area has been generated by studies on animals (primarily rodents and non-human primates) in which prenatal stress can be experimentally manipulated. These studies indicate that exposure to stress during pregnancy results in motor impairment, comparatively poorer aptitudes for learning, and interference in the ability to cope with stress and novelty long after birth,<sup>5,8</sup> thus illustrating the role of the hypothalamic-pituitary-adrenal axis in mediating these effects.<sup>9</sup>

### **Key Research Questions**

Based on data from animal models, the following questions regarding human pregnancies have been posed.

- a) Do maternal stress and emotions contribute to preterm delivery and low birth weight, which may, in turn, have ramifications on development?
- b) Do maternal stress and emotions directly affect the foetal nervous system, thereby resulting in alterations in cognitive, behavioural, or emotional development after birth?

### **Recent Research Results**

The answer to the first question is a qualified "yes." That is, maternal stress and anxiety are associated with pregnancy complications, preterm delivery, and reduced weight at birth,<sup>10-12</sup> while positive psychological influences (such as social support and maternal optimism) reduce such outcomes.<sup>13,14</sup> The second question is informed by only a few prospective studies. Outcomes that have been linked with prenatal stress or anxiety range from reduced motor maturity in infancy<sup>15,16</sup> to deficits in regulatory control of behaviour during childhood<sup>17-19</sup> and psychiatric disorders in adulthood.<sup>20,21</sup> When sex differences are examined, boys tend to be more negatively affected by prenatal maternal distress than are girls.

### **Conclusions**

While there is mounting evidence that prenatal stress is associated with general pregnancy outcomes (including shortened gestation and lowered birth weight), these measures are not substantial enough to portend serious developmental effects. However, it remains biologically plausible that maternal stress and emotions during pregnancy directly affect the developing foetal nervous system, and that relatively small prenatal effects may be exacerbated over time by changes in the trajectory of postnatal development. Animal models provide convergent and cumulative data that support this position. Current evidence in humans is weak on this count, and it is uncertain whether findings from animal studies are applicable. Existing research on the influence of

maternal stress and anxiety on child behavioural and cognitive development is not well-defined or integrated, lacks methodological consistency and (at times) scientific rigour. The development of conceptual and empirical support is most advanced among outcome measures that concern motor development and the capacity to regulate behaviour. Limitations that affect the interpretation of data include their correlational nature, difficulties in distinguishing stress from other psychological attributes, and specifying the impact of prenatal stress on the child-rearing environment, independent of the impact of postnatal stress on that environment. There is not enough evidence to establish conclusive proof of prenatal maternal stress as a developmental teratogen at this time.

### **Implications**

Faced with insufficient scientific data, pregnant women and their providers should adopt a common-sense approach to managing prenatal stress and determining when stress should be mitigated. The assumption that “stress is bad, therefore stress will hurt my baby” is unjustified; in addition to the caveats noted above, in some circumstances prenatal stress can accelerate rather than retard maturation.<sup>22,23</sup> Ultimately, our understanding of the relationship between a mother’s psychological state and development in the foetus she carries will likely reveal complex relations with regard to child psychosocial development. Public policy issues in this area of research would include maternal employment and maternity leave. In point of fact, is not uncommon for pregnant women to work until the time of birth. We hardly need research on the role of prenatal maternal stress in child development to deduce that this may not be an optimal societal expectation. Women who work at demanding, stressful jobs throughout pregnancy may enter labour, delivery, and the ensuing years of child dependency with depleted energy reserves. Furthermore, the implications of maternal stress on the postnatal environment that is created for the infant may be of greater consequence than the biological effects of prenatal exposures. Nonetheless, because it is up to each woman to subjectively appraise whether an event or circumstance is stressful, public policy to govern the behaviour or activities of pregnant women in the interest of improving child developmental outcomes should not, and likely will not, be established.

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To cite this document:

DiPietro J. Prenatal/perinatal stress and its impact on psychosocial child development. In: Tremblay RE, Barr RG, Peters RDeV, eds. *Encyclopedia on Early Childhood Development* [online]. Montreal, Quebec: Centre of Excellence for Early Childhood Development; 2002:1-5. Available at: <http://www.child-encyclopedia.com/documents/DiPietroANGxp.pdf>. Accessed [insert date].

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