

## Maternal Stress

### Importance

**What is stress?** Stress in moderation is very important and the way the body maintains balance (homeostasis). However, too much stress can have a toll on the body and can lead to various complications such as poor fetal growth and preterm birth. Unfortunately, the biology of stress is different in non-pregnant women compared to pregnant women. In general, having a baby is stressful to the body because of all the endocrine and physiologic changes that take place. What is different is that pregnant women have a placenta acting as an extra brain to take over many of the functions that the woman's brain normally carries out. In the non-pregnant state a "stressor" causes the brain to release hormones such as corticotrophin releasing hormone (CRH), or adrenocorticotrophine hormone (ACTH) that turn on the adrenal gland to make a stress hormone, cortisol to help the woman adapt to a stressful situation. In the non-pregnant state cortisol shuts off the brain by inhibiting the further release of CRH and ACTH; however, in pregnancy cortisol stimulate the release of placental CRH. Thus repeat acute stressful events and/or chronic stress leads to a state where excessive CRH is made by the placenta having an additive and potentially detrimental effect on the pregnancy by resetting "the placental clock" that is now thought to be a cause of preterm labor and early delivery.

Families have suspected that stress such as anxiety, sorrow, or worry disturbs the fetus and can cause physical harm. Recent epidemiological evidence supports our cultural knowledge and demonstrates that maternal psychosocial stress, and other related stressors such as strenuous physical activity and poor nutrition are independent risk factors for preterm birth and low birth weight. The hormone, CRH, appears to play a critical role in the physiological

mediation of stressful experiences (i.e., work stress, poor nutrition, financial stress, psychological stress) and risk of preterm birth. In addition to the direct effect of elevated CRH on the initiation of labor, it may also modify the immune system and the woman's ability to respond to other risk factors, making her more susceptible to infection or the pathological consequences of infection.

New research suggests that anxiety related to pregnancy is the strongest stress-related risk factor for preterm birth. The types of anxiety and fears that women experience include:

- fears and anxiety about the outcome of the pregnancy,
- the experience of labor,
- the ability to care for a new baby, and
- the health and well-being of the baby.

Although psychosocial stress is a significant risk factor for preterm birth, not all women reporting high levels of psychosocial stress deliver preterm. Many factors contribute to the woman's response to stress including:

- the nature of stressful experience
- the timing of stress during gestation
- availability of a support system and other resources to mediate the stress; and
- the combined effects of stress and other risk factors such as infection, work strain, or nutritional deficiency, and substance use.

The birth of a child can be a joyous and eagerly awaited event. However, it can also create many new changes within the family. Fatigue, increased responsibilities, and new schedules often accompany parenthood, and can add to

the stress already experienced by the mother and family. While stress is impossible to avoid, recognizing and managing stress early is key.

## Tools for Screening for Maternal Stress

Evidence supports the idea that stress can increase the risk of having a low birth weight or preterm birth. In general, evidence suggests that different types of support provided to pregnant women are likely to be beneficial in pregnancy. The recommended screening for maternal stress is as follows:

- identification of women experiencing high levels of stress,
- determination of the specific stressful sources, and
- referral for appropriate services (social support, prenatal and parenting education interventions)

This screening procedure has a reasonable likelihood to improve the outcome of pregnancy by reducing the risk of low birth weight and preterm birth in vulnerable women. This intervention will likely be most effective when combined with the other prenatal care quality improvement interventions such as screening for maternal depression, substance abuse, nutritional status, and infection. There are very few studies that have implemented several assessments and interventions at the same time such as interventions for stress, smoking, infection and nutrition to evaluate the effect of combined interventions on preterm birth and/or low birth weight. From new understanding of complex diseases, it is only by acting through multiple interventions simultaneously that interventions are likely to work.

In 2003 the Los Angeles Best Babies Collaborative began working with the March of Dimes under the direction of Drs Calvin Hobel

Christine Duckel-Schetter to develop a comprehensive yet brief as possible screening tool for wide implement as part of the March of Dimes' 5 year program to reduce preterm births in the United States (1). We currently use the following four measures of stress, each measuring different aspects of stress over time:

1) **Life Events** are measured using portions of the 99-item version of the schedule of recent life events as described by Homes & Rahe. This scale assesses disruptive changes in personal, family, interpersonal, social financial and work-related areas that are not usually everyday occurrences (2).

2) **State Anxiety** is assessed using the 20-item State Anxiety form of Spielberger. This scale measures the status of acute stress (3).

3) **Chronic Stress** is measured using the 14-item Perceived Stress Scale described by Cohen, Kamarck & Mermelstein which is a global measure of perceived stress. This scale assesses the degree to which situations during the last month were appraised as stressful (i.e. the degree to which respondents found their lives unpredictable, uncontrollable, and overloading)(4).

4) **Pregnancy Related Anxiety** is a newer scale developed to take into account the events during pregnancy which could also become stressors. This scale was in part developed by the Behavior In Pregnancies Studies at University of California, Los Angeles, Cedars-Sinai Medical Center and University of California, Irvine using some of the previous work by Lederman (4,5). It is measured with a 5-item scale, extracted by factor analysis from a larger set of items designed by our group. This instrument assesses maternal fears and anxiety related to the health of the baby, toward the labor and delivery process and confidence in the obstetrician and other health care providers (4).

## Steps to Implementing Stress Reduction and Social Support

“Social support” is the intervention most often studied in pregnancy. Social support has been principally defined as either available or perceived support, or alternatively as received or enacted support. Pregnancy research has also focused on different sources of support, the baby’s father, the mother’s partner or a network or group (friends and family). In general the support from the baby’s father has been found to be especially important among certain cultures such as in Mexican immigrant women. In contrast to the baby’s father, support from the family does not seem to be as significant a predictor of pregnancy outcome.

Three functional aspects of perceived social support have been most commonly studied. These are tangible or material support, informational (or advice) support, and emotional support. In general, evidence suggests that different types of support are likely to be beneficial in pregnancy. Thus, social support for women with stress and/or depression is recommended.

## Source Materials & Useful Resources

- 1) Dunkel-Schetter C. Maternal stress and preterm delivery. *Prenat Neonat Med* 1998;3:39-42.
- 2) Homes TH, Rahe RH. The social readjustment rating schedule. *J Psychosom Res* 1967;11:213-18
- 3) Spielberger CD. *Manual for State-Trait Anxiety Inventory*. Palo Alto, CA, USA: Consulting Psychologists Press, 1983

- 4) Lederman RP. *Psychosocial adaptation in Pregnancy: assessment of seven dimensions of maternal development*. Engelwood Cliffs, New Jersey: Prentice-Hall, 1984
- 5) Wadhwa, PD, Sandman CA, Porto M, Dunkel-Schetter C, Garite TJ. The association between prenatal stress and infant birth weight and gestational age at birth: A prospective investigation. *Am J Obstet Gynecol* 1993;169:858-65.
- 6) Hobel C. Stress and Preterm Birth. *Clin Obstet Gynecol* 2004;47(4):856 (in press)

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