EXTENDED ABSTRACT

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Hormonal Cascades of Pregnancy: How Drug Delivery can Regulate Peri and Post-Partum Neurogenesis and Emotional Outcomes Among Women

Tabinda Hasan

Princess Nourah University, KSA

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Abstract:

Numerous factors regulate mood changes of pregnancy; such as physiological/biological shifts related stress, changes in metabolism, or shifting levels of estrogen, progesterone and Oxytocin hormones. Ovarian hormones prepare the mother's body for successful fertilization while placental hormones promote maternal adaptations to ensure optimum fetal growth and sustain pregnancy; Changes in hormone levels can significantly affect production of mood-regulating neurotransmitters. Each woman responds to these changes differently. Some experience heightened emotions, while others feel depressed or anxious. It has been generally observed that moodiness flares around 6-10 weeks of pregnancy, eases during second trimester, and reappears as the 'due date' approaches.

Prolactin enhances nursing, Oxytocin is a 'feel good hormone' that increases the baby's maternal feelings of affection and bonding for the baby while unexpected changes in 'Progesterone- Estrogen levels' during pregnancy and after delivery have been commonly linked to depression or anxiety. These hormone cascades are regulated by positive & negative feed-back mechanisms. In 'sudden termination of pregnancy' events as well as 'extended breastfeeding 'or 'abruptly ended breast feeding'; maternal adaptations to changed hormone levels are insufficient and extreme outbursts like self-harm and even harming of the baby might occur. The maternal brain is remarkably plastic and exhibits multifaceted neural modifications. Hormone delivery mechanisms can facilitate affective neurogenesis and development of cordial neural networks. Hence, choosing and delivering 'appropriate doses' of 'required hormones' along temporally coordinated mechanisms might positively influence psycho-social and maternal and child health outcomes. This review highlights peri-partum adult neurogenesis and associated mood changes with underlying hormonal mechanisms. It also elucidates the functional implications of neurogenesis in the peripartum brain and to what degree to which this process may play a role in maternal treatment, cognitive functions and postpartum mood. Eventually, the research explores and addresses the impact of hormone based on the maternal neurogenesis on parenting styles.

Estrogen and progesterone are the main pregnancy hormones. A woman can produce more estrogen throughout one pregnancy than in her entire life when not pregnant. The rise in estrogen during pregnancy helps the uterus and placenta to: enhance vascularization (the development of blood vessels).

The main Pregnancy hormone include FSH, LH, HCG, Estrogen, Progesterone, Relaxin, Placental growth factor, HPL, Oxytocin, Prolactin.

FSH: Follicle stimulating hormone is the first in a cascade of hormones that's required to start your pregnancy and is available before you even conceive.

LH: Luteinizing hormone functions in tandem with FSH to orchestrate the menstrual cycle. All FSH and LH are inhibited during pregnancy itself.

Estrogen: Stimulated first by hCG and later by the placenta, estrogen helps the uterus expand, controls the production of other main hormones, and activates the growth of baby's organs, among other functions.

Progesterone: Similarly, to estrogen, this pregnancy hormone is first activated by hCG and then the placenta. Among its many other uses, progesterone stimulates breast tissue development and later helps relax ligaments and cartilage to prepare you for labor.

Relaxin: This hormone is used primarily for calming the muscles, bones, ligaments and joints later in pregnancy in preparation for childbirth.

Oxytocin: While it's present during your pregnancy, this muscle contracting hormone is mainly known for inducing labor contractions.

Prolactin: This hormone causes your breasts to increase in size and ultimately produce milk.

Pregnancy is typically a period of mental well-being for women. The occurrence of mood disturbance, depression, and psychiatric hospitalizations is small relative to non-pregnant women.

A plethora of neurochemicals including steroid hormones, neuropeptides and classic neurotransmitters, fluctuates through late pregnancy

and the early postpartum era to control maternal physiology, caregiving attitudes, awareness, emotions and mood. For humans, emotional and mood conditions that are not too high (e.g. anxiety, mania), nor too low are equally ideal for mothers to better attend to the needs of their infants.

Postpartum depressive disorder can be controlled with psychological care, education, and psychotherapy, while others may require antidepressant medications. Latest studies indicate that the frequency and duration of breastfeeding has increased. A neuroendocrine basis for postpartum depression involving the removal of hormones at parturition has always been suspected, so it is not surprising that adoptive mothers of infants or toddlers often display higher depressive symptoms soon after becoming a parent. Endocrine flux can occur in nonparturient humans as they become parents and communicate with infants, although the changes are definitely less drastic than those occurring in recently parturient people.

Therefore, both non-endocrine factors and endocrine factors also unrelated to reproductive state are important for depression in new human parents.

Animal literature that develops but is still relatively small shows that behavior such as depression in female rats is very low in early third week of pregnancy, but this behavior is largely unchanged. among women tested at the end of pregnancy, during the early postpartum period, or when nulliparous.

Maternal depression is a common public health epidemic, with mothers and their offspring suffering considerable economic and health costs.

Although universal screening initiatives tend to improve the detection of PPD, these measures have to date been largely unsuccessful in reducing PPD, and there are no evidence suggesting significant downstream impacts on infants.