JOGNN

IN FOCUS

CNE

Continuing Nursing Education (CNE) Credit

A total of 1.9 contact hours may be earned as CNE credit for reading "Hormonal Physiology of Childbearing, an Essential Framework for Maternal–Newborn Nursing" and for completing an online posttest and evaluation.

AWHONN is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.

AWHONN holds a California BRN number, California CNE Provider #CEP580.

http://awhonn.org/?OnlineLearningCenter

Hormonal Physiology of Childbearing, an Essential Framework for Maternal–Newborn Nursing

Carol Sakala, Amy M. Romano, and Sarah J. Buckley

ABSTRACT

Knowledge of the hormonal physiology of childbearing is foundational for all who care for childbearing women and newborns. When promoted, supported, and protected, innate, hormonally driven processes optimize labor and birth, maternal and newborn transitions, breastfeeding, and mother–infant attachment. Many common perinatal interventions can interfere with or limit hormonal processes and have other unintended effects. Such interventions should only be used when clearly indicated. High-quality care incorporates salutogenic nursing practices that support physiologic processes and maternal–newborn health.

JOGNN, 45, 264–275; 2016. http://dx.doi.org/10.1016/j.jogn.2015.12.006

Accepted July 2015

Correspondence
Carol Sakala, PhD, MSPH, Director of Childbirth Connection Programs, National Partnership for Women & Families, 1875 Connecticut Ave., NW, Washington, DC 20009.
csakala@nationalpartnership.org

Keywords
beta-endorphins
hormonal physiology
maternal–newborn safety
onset of labor
oxytocin
perinatal interventions
precautionary principle
prolactin
stress hormones

The authors and planners for this activity report no conflict of interest or relevant financial relationships. No commercial support was received for this educational activity.

Innate, hormonally driven maternal and fetal/newborn processes of parturition and the early postpartum period have developed over many millions of years of mammalian evolution to enhance individual and species survival. These processes are not well understood within the current maternity care system. Childbirth Connection Programs at the National Partnership for Women & Families recently issued an up-to-date synthesis of a very large body of research on these matters. In *Hormonal Physiology of Childbearing: Evidence and Implications for Women, Babies, and Maternity Care,* Dr. Sarah J. Buckley (2015) presented abundant support for the position that a hormonal physiology framework should be foundational for the education of those providers who care for childbearing women and newborns and should have a prominent role in guiding the organization and provision of maternity care. In this article, we present the most relevant results from this report for nurses who care for women from late pregnancy through the early postpartum period and for newborns. We describe current knowlege of normal hormonal physiology and the benefits of physiologic labor, birth, and early postpartum/newborn processes for women and their fetuses/newborns. We also summarize how common maternity care interventions may affect hormonal processes and identify recommendations for nursing practice. We encourage readers to consult the full report and related resources, which are freely available online (Childbirth Connection, 2015) and to share these findings with colleagues, students, women, and others. The report appendix contains multiple resources, freely available, to help clinicians and women learn more to improve maternity care practice.

Hormonal Physiology of Childbearing and Benefits for Women and Fetuses/Newborns

When hormonally driven processes from pregnancy through the early postpartum period are promoted (through favorable policies and system capacities), supported (directly, with facilitating care), and protected (from practices and environments that can disturb the processes), they optimize labor and birth, maternal and newborn transitions, breastfeeding, and mother–infant attachment. Here, we discuss the physiologic onset of labor and the action of four major hormone systems from late pregnancy through the early postpartum period. These systems are interrelated

during childbearing, and each amplifies or dampens the effects on other hormone systems.

Physiologic Onset of Labor

The physiologic (spontaneous) onset of labor is incompletely understood. Its timing is thought to be determined by the maturity of the fetus (via cortisol production) and coordinated with the woman's readiness for parturition (via estrogen production) among other processes (Liao, Buhimschi, & Norwitz, 2005). Because of considerable variation in the length of human gestation (Jukic, Baird, Weinberg, McConnaughey, & Wilcox, 2013), the timing of physiologic onset of labor is difficult to predict.

Maternal and fetal processes in the weeks and days before the physiologic onset of labor at term involve an elaborate set of preparations for the upcoming tasks. Preparations in the woman, for example, include hormonal changes that foster efficient contractions before and after labor (Fuchs, Fuchs, Husslein, & Soloff, 1984) and support analgesic effects during labor (Gintzler & Liu, 2001). Preparations in the fetus include maturation of vital organs, reduction of fluid in the lungs, and increase in epinephrine–norepinephrine (E–NE) receptors to prepare for a protective fetal catecholamine surge late in labor at the time of strong contractions (Hillman, Kallapur, & Jobe, 2012). In animal studies, investigators have identified many additional preparations that occur before the physiologic onset of labor that include preparations for maternal behaviors (Meddle, Bishop, Gkoumassi, van Leeuwen, & Douglas, 2007) and lactation (Mann & Bridges, 2002; Meddle et al., 2007) in the postpartum period. In animal studies, investigators also found that important preparations for upcoming tasks continue to occur even in the final hours before the onset of labor (Hayes & De Vries, 2007). Because hormonal actions facilitate tasks of a given phase and prepare for upcoming tasks, these processes contribute to a beneficial hormonal physiology pathway.

Oxytocin

Of the hormone systems described in this article, oxytocin (OT) is by far the best studied and understood. Variously known as the hormone of love, calm and connection, and trust, OT is involved with a broad array of reproductive and nonreproductive functions in women and men. For example, OT is involved with social–affiliative behavior; social engagement; regulation of the autonomic nervous system; reduction of stress, anxiety, and fear; pleasure and reward; and healing and growth (Viero et al., 2010).

When promoted, supported, and protected, innate, hormonally driven processes optimize labor and birth, maternal and newborn transitions, breastfeeding, and mother–infant attachment.

In pregnancy, the maternal OT system is involved with preparations for efficient labor and contractions that minimize bleeding after birth. During labor, maternal pulsatile OT released from the pituitary gland promotes rhythmic uterine contractions, and episodic exposure of the mother's uterus to OT helps maintain OT receptor sensitivity and effective contractions. As labor progresses, positive OT feedback cycles make labor increasingly effective, as shown in animal models (Douglas et al., 2001), and generate the expulsive forces of the late-labor Ferguson reflex. Oxytocin during labor helps with stress and pain (Mazzuca et al., 2011) and fosters maternal adaptations that are beneficial to infants (Russell, Leng, & Douglas, 2003; Uvnäs-Moberg, 1996). Elevations of fetal OT with physiologic childbearing may assist with fetal stress and pain (Mazzuca et al., 2011).

Peaks of OT immediately after physiologic birth benefit women and newborns (Matthiesen, Ransjö-Arvidson, Nissen, & Uvnäs-Moberg, 2001). Oxytocin elevation at this highly sensitive time reduces the likelihood of excessive bleeding in the woman and may prime longer-term maternal adaptations. Elevated newborn OT levels may have calming effects that assist with newborn transition and breastfeeding initiation. Vasodilation of the mother's chest from OT peaks (Bystrova et al., 2007) and early skin-to-skin contact keep the newborn warm (E. R. Moore, Anderson, Bergman, & Dowswell, 2012). In turn, skin-to-skin contact and newborn prebreastfeeding behaviors enhance maternal OT action at this time (Matthiesen et al., 2001). Early breastfeeding may contribute to longer-term breastfeeding success (E. R. Moore et al., 2012) by the optimization of the OT system. Pulsatile OT release during breastfeeding mediates the letdown reflex (Ueda, Yokoyama, Irahara, & Aono, 1994), promotes prolactin (PRL) release (Borrow & Cameron, 2012), and fosters calm and connection of mother and infant (Uvnäs-Moberg, 2003).

The OT system is also linked to stress reduction, protective and attachment behaviors

Carol Sakala, PhD, MSPH, is Director of Childbirth Connection Programs, National Partnership for Women & Families, Washington, DC.

Amy M. Romano, MBA, MSN, CNM, is Senior Vice President of Clinical Programs, Baby+Co., Cary, NC.

Sarah J. Buckley, MB, ChB, Dip Obst, is a writer and speaker, Brisbane, Queensland, Australia.