

Practicing Evolutionary Medicine in a Postnatal Ward

Ameliorating Iatrogenic Obstacles to Breastfeeding

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The anthropology of childbirth employs an array of theoretical lenses to examine human parturition and early infant care. Anthropologists such as Jordan (1993), Martin (1987), Kitzinger (2006), Davis-Floyd (2008) and Sargent (1997), along with physicians like Rosen (1989) and Odent (2004), have critically assessed the spectrum of health care paradigms influencing contemporary childbirth, including technocratic models of medicalized birth. It is argued that under such a system technology and hospital protocols determine birth practices to a greater extent than empirical data or maternal preference. As several recent reviews of evolutionary medicine and health have demonstrated, evolutionary perspectives are increasingly being incorporated into a re-examination of the impact of medical practices on parturition, expanding our understanding of health-related experiences and behavior by acknowledging the legacy underlying our biology. Reproduction is a salient area for the application of evolutionary perspectives, both because it is crucial to the evolution of all living organisms and because interventions in human childbirth (introduced over the past century for infection control, risk management and convenience) have, we argue, unwittingly harmed the health and well-being of families by undermining our evolutionary biology.

From the viewpoint of evolutionary medicine, anthropologists are now exploring consequences of the technocratic model of birth and postnatal care. This commentary summarizes recent research examining how efforts to improve breastfeeding initiation rates in the UK are undermined by certain

routine childbirth practices. We consider how the evolved physiological needs of mothers and infants in establishing effective suckling and lactation are disrupted by physical separation and cesarean delivery. We take as our starting point the observation that when maternal-newborn contact follows a spontaneous-onset labor and a drug-free vaginal birth, mothers and their infants influence and regulate aspects of one another's physiology and behavior. Prior to the advent of hospitalized births and the provision of labor anesthesia this was the typical experience for mothers and babies.

Mother-Infant Separation

Over the past two decades, continuous "rooming-in" with an infant in a bassinette positioned alongside the maternal hospital bed has become standard UK postnatal ward practice. This enhances breastfeeding initiation compared to nursery care, but a bassinette does not permit unhindered access or spontaneous suckling. In video-research of mother-infant interactions following vaginal deliveries we documented, via a randomized trial, that postnatal ward sleeping arrangements involving unhindered mother-infant nighttime contact resulted in more frequent nighttime breastfeeding and a longer duration of breastfeeding than standard rooming-in.

Active facilitation of maternal-infant proximity (eg, via provi-

sion of three-sided cribs that clamp onto the frame of the maternal hospital bed) provided opportunities for maternal rest and breastfeeding, extended the benefits of delivery room skin-to-skin contact for the duration of the postnatal stay, and helped mothers recognize their infant's feeding cues. Side-car crib provision enhanced maternal perception of infant breastfeeding interest and shortened feed inter-

vals, thereby increasing prolactin levels and triggering the earlier onset of full milk production. This has repercussions for the activation of prolactin receptors and in turn for long-term lactation. In an ongoing large-scale trial these longer-term outcomes are now being assessed. These findings also suggest how the consequences of other disruptors to breastfeeding, such as operative delivery and avoidance of labor, may be understood and ameliorated.

Cesarean Section Delivery

Cesarean deliveries are now common, yet the way in which this delivery mode alters the interrelated physiology and behavior of the mother-infant dyad has received little attention. It is easy to overlook the costs incurred, since clinical outcomes are usually favorable and the complications that do arise are generally not life threatening in industrialized settings. However, Pérez-Ríos et al's recent epidemiological research (*Journal of Human Lactation* 24[3]) suggests that cesarean section poses a barrier to breastfeeding. Previous studies associate cesarean delivery with delayed early contact between the mother and baby, later breastfeeding initiation and delayed onset of full milk production, in comparison with vaginal birth. Although commitment to breastfeeding is associated with its achievement regardless of birth mode, the practical and physio-

logical consequences of operative delivery contribute to the lower breastfeeding rates observed in cesarean populations.

The innate behavioral repertoire of human infants upon which early parental interaction and breastfeeding are predicated is disrupted by the biologically unexpected experience of cesarean delivery. It is well documented that rooting, nipple seeking and suckling are

suppressed by various aspects of cesarean section including: lack of exposure to labor hormones, absence of fetal compression from uterine contractions, and transmission to the infant of surgical anesthesia and postpartum medications. Infants who are delivered by non-labor cesarean section are at greater risk of inadequate lung fluid clearance, breathing difficulties, lower metabolic rate, less alertness and decreased neurological response in the immediate postpartum period compared to those who experienced labor. These interrelated disruptions to early infant feeding are a public health concern because all shorten breastfeeding duration, resulting in infants exhibiting poorer health outcomes.

Because they do not undergo biologically-expected parturition experiences, cesarean delivered newborns often need greater care; however, their mothers are rendered less capable. Maternal capacity to move and lift is limited in the immediate post-cesarean period and maternal endocrine profiles are affected by non-labor cesarean delivery. Consequently breastmilk transfer to term infants in the first few days is less effective after a cesarean than a vaginal delivery, and mothers experience delayed and reduced secretion of prolactin and oxytocin. This results in a lower volume of breastmilk, which directly impacts maternal perceptions of adequacy and motivation with regard to breastfeeding. As frequent stimulation is required to promote production of prolactin receptors in the breast tissue, and these receptors facilitate milk production once the lactation process switches to autocrine control, cesarean delivery not only undermines the initiation of lactation, but also its continuation (see Riordan's *Breastfeeding and Human Lactation*). Furthermore, as cesarean delivery necessitates greater self-investment during recovery there is also a risk that maternal investment in her infant may be reduced, and time and energy displaced from lactation. A longer inpatient stay is recommended after cesarean delivery to assist in breastfeeding



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views of and experiences with hospital birth.

There are indeed considerable barriers to conducting ethnographic research on childbirth practices in hospital settings, including gaining access to the setting, approval by institutional review boards and honoring Health Insurance Portability and Accountability Act regulations. However, as pioneering birth ethnographer Nancy Stoller Shaw noted to me, prisons are also notoriously difficult institutions to conduct research in, and ethnographers have managed to do that. I urge my colleagues

in the anthropology of reproduction to engage in local ethnographies of US obstetric culture, and I invite interested persons to contact me to discuss how to become involved in working with change leaders in obstetrics.

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establishment, but limited hospital space constrains this option. Interventions to facilitate effective lactation and breastfeeding among this population of mothers and infants are therefore needed in order to inform hospital breastfeeding policies and practices for post-caesarean women and infants.

To this end Klingaman is currently examining the effects of mother-infant proximity among dyads experiencing scheduled, non-labor caesarean deliveries at a UK National Health Service hospital. The participants are prenatally randomized to receive either a normal bassinet (control) or side-car crib (intervention) for their postnatal stay. Semi-structured interviews and overnight video-recordings are conducted for women and their single, full term infants. The video observations aim to document the impact of the crib type on breastfeeding and allow us to capture unique insights into delivery-related maternal-infant postnatal experiences. Video-coding using an ethological taxonomy and software allows us to rigorously quantify breastfeeding behavior between the two trial arms. The results of this trial will be published at the end of 2009.

Female strategies for balancing energetic trade-offs in order to optimize inclusive fitness between current and future reproduction have existed throughout

mammalian and primate history. Breastfeeding involves a maternal energetic burden that increases following operative delivery and that is exacerbated by mother-infant separation and disrupted lactational physiology. Confronted with these additional costs it is unsurprising that exclusive breastfeeding following cesarean delivery is poor. Use of an evolutionary lens to examine this issue encourages recognition of the tradeoffs involved in human reproductive behavior and physiology, and helps identify ways of ameliorating their impact. Maintaining mother-infant unhindered access on the postnatal ward helps to facilitate expression of the normal physiological and behavioral pathways leading to successful lactation and breastfeeding.

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Helen Ball is professor of anthropology, fellow of the Wolfson Research Institute, and director of the Durham University Parent-Infant Sleep Laboratory. She has been researching parent-infant behavior since 1995 and works with organizations and hospitals to bring the perspectives of evolutionary medicine into postnatal care policy in the United Kingdom and around the world. ☐

After Obstetric Fistula

A Cured Patient Returns to Her Life

ANNA MARSHALL
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This photograph shows two women, a nurse (right) and a mother (left) once known only by her condition—as a woman who gave birth to a stillborn baby and as a wife seen as a burden to her husband. She became unknown to her community as she was forced to live in isolation and shame. Until recently, she was one of more than two million women in the developing world suffering from obstetric fistula, as documented by Ahmed et al in “Dead Women Walking” (*International Journal of Gynecology and Obstetrics* 99).

Obstetric fistula (OF) is a devastating consequence of prolonged labor, described by the World Health Organization (WHO) as “the single most dramatic aftermath of neglected childbirth.” OF



Photo courtesy Anna Marshall

is an abnormal opening that forms between the vagina and bladder (vesico-vaginal fistula) or the vagina and rectum (recto-vaginal fistula). It results in incontinence as well as other problems that affect childbearing ability, psychosocial well-being and physical capability.

An assessment produced by United Nations Population Fund-Kenya notes that this can disable a sufferer to the degree that she is unable to fulfill the roles of a mother and wife, as socially defined. Despite being preventable and treatable, obstetric fistula remains one of the most neglected issues in maternal health and rights.

Although OF can occur with any birth, in today's world it is primarily confined to girls and women in the developing countries. Childhood malnutrition, poor education, early marriage, early childbirth and gender inequality are underlying sociocultural factors associated with prolonged obstructed labor that can lead to OF development. Immediate factors include lack of access to maternal health services and emergency obstetric care. The woman in this photograph was treated at the Addis Ababa Fistula Hospital—a center dedicated to providing services for those suffering from OF. She describes her recovery as allowing her to “regain her life.” Such treatment continues to be unavailable to many other women in Ethiopia and throughout the world.

Anna Marshall is a fourth year medical student at the University of Leeds. She elected to take an extra year studying international health, which included her work at the Addis Ababa Fistula Hospital and her exploration of the social factors associated with the occurrence and treatment of obstetric fistula. She dedicates this article to the patients of the Addis Ababa Fistula Hospital. ☐