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Anthropology of caesarean section birth and breastfeeding: Rationale for evolutionary medicine on the postnatal ward

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Abstract

Investigating biology and behaviour in the context of evolution enables the public, scientists and medical professionals to better understand the impact of particular medical care on human physiology and emotions. Evolutionary medicine is a useful starting point because recognition of the possible mismatches between an individual's predisposition to interact a certain way and the environment in which he or she is found can lead to practical improvements. Human parturition and postnatal care are salient examples of how culturally constructed beliefs can inhibit appropriate somatic and psychological support. Our research examines birth events, feeding strategies and the attitudes underlying them in order to better understand how modes of delivery and postnatal arrangements affect breastfeeding outcomes, maternal satisfaction and safety.

Keywords: Birth, breastfeeding, infant care, evolution and health

1. Anthropology and evolutionary paediatrics

1.1. Anthropology can be defined as the holistic study of humanity. The discipline endeavors to better understand the complexities of our behaviours and the mindset of individuals and societies. Biological anthropology facilitates an appreciation for the impact of particular lifestyles on human physiology and emotions. Behavioural and morphological changes gradually occur in the continual process of natural selection, but societies rapidly devise procedures that often lead to unintended difficulties in one or more of these elements (Nesse and Williams 1995). Social anthropology places people's actions and philosophies in the context of their traditions and expectations formed through time. The science is characterised by research methods of engaging in trusting, in-depth relationships with subjects and analysing data in relation to studies of the issue in other time periods, cultures, species and with interdisciplinary measurements. Our research area investigates the intertwined biological and cultural aspects of birth and breastfeeding in post-industrial western obstetrics.

1.2. The emerging field of evolutionary paediatrics is a useful starting point to improved maternal and infant health because recognition of the possible mismatches between an individual's predisposition to interact in certain ways and the situations he or she currently confronts can lead to practical changes (Ball and Klingaman in press; Bowlby 1969; Dettwyler 1995; Hrdy 1999; Leidloff 1997; McKenna and McDade 2005; Montagu 1986; Small 1999; Trevathan 1987). Our common understanding of how clinical-'patient' and mother-baby relationships are structured and the ways in which birth 'ought' to progress are actually culturally defined and may clash with care giving practices that feel right to both health professionals and families (Odent 2002; Simkin and Ancheta 2005). A more complete perspective on breastfeeding after caesarean section delivery is important in a time when rates of operative birth are at their highest worldwide (Mayor 2005; Belizan et al. 1999; Lee 2004; Donati 2003; Menacker 2005; Walker 2004).

2. Role of Anthropology in Understanding and Improving Maternal-Infant Health

2.1. Evolutionary medicine contributes to collaborative research approaches, academic discourse, public health policy and, above all, a theoretical framework of why a certain repertoire of human behaviours is normal and to be expected. Human parturition and postnatal care are salient examples of how culturally constructed beliefs and practices can impede appropriate support. Contrary to the view that evolutionary theory essentialises roles and idealises 'stone-age' ways of living (Hausman 2003), our interest is in elucidating the ultimate explanations of bodily processes such as lactogenesis II (the onset of 'full' milk production) and the ways in which health practices, like mother-infant postnatal separation or scheduled infant feeding, inhibit their expression.

2.2. Until recently, human parturition was an event on a continuum of infant dependence on his or her mother for nutrients, physiological regulation, protection and

love (Scheper-Hughes 1992). Survival of young in the Mammalian Class, including primates and humans, is by definition contingent upon an adequate transfer of mothers' milk. The need for continuous contact, physical support and frequent feeding has been even more pronounced in our species because we are born the most neurologically immature of all mammals, with 75 percent of brain growth occurring postnatally (Konner 1981). Chimpanzees are the closest primate comparison, but their young have 45 percent of their adult brain mass at birth and the infants can cling to mothers' fur (Hrdy 1999). Human gestation is constrained by the structure, size and rigidity of the female pelvis and birth canal (Trevathan 1987). It has been estimated that pregnancy would last around 18 months, if the neonatal cranial size allowed passage (Martin 1990). Instead, humans are born secondarily altricial and function in ways more similar to a fetus during a 6-9 month 'extergestation' (Montagu 1961). This 'obstetrical dilemma' of being born totally dependant on others and remaining so for such an extended period of time arose from the conflicting human adaptations of bipedalism and then encephalisation (Washburn 1960; Trevathan 1987).

2.3. Evolutionary theory does not look to 'traditional' ways of life or nature to prescribe a set of actions or impose moral judgments – the science explains why novel environments may unwittingly lead to suboptimal physical and emotional outcomes. Motherhood has implied compromise of time and energy throughout history, with women assisted through labour and raising offspring by birth attendants and alloparents (caretakers other than mother and father) (Hrdy 1999). Our infants are born with the need for continual contact and care, but the post-industrial western adoption of the now standard medical technologies divorces people, especially mothers, from the center of infant care. As discussed in Ball and Klingaman (in press), the widespread availability of epidurals, opiate analgesics, non-medically necessitated caesarean section delivery, artificial formula and of routine weighing of newborns undermines women's opportunities to initiate and establish their positions as mothers. Authoritative relationships often form from hierarchical reliance on technology and trust placed in 'infant experts' (Davis-Floyd and Sargent 1997), contributing to birth modes and postnatal rituals that do not necessarily lead to better health outcomes, while distancing mothers from their bodies, instinct and offspring.

3. Novel Challenges to Breastfeeding

3.1. Rapid, recent changes in modes of delivery, postnatal practices, parental expectations and feeding options from hominin experiences pose new challenges for the mother-infant dyad. Although breastfeeding contributes to better health outcomes for infant and mother, can help to delay a new pregnancy and facilitates attachment, no more than 35 percent of babies worldwide are currently exclusively breastfed during the first 4 months of life (WHO 2003). Infants can thrive in a vast array of care environments, but there are consequences from every method (Small 1999) – and some effects persist through adulthood. International health programmes advocate the importance of the symbiotic mother-infant dyad, especially in relation to feeding in statements such as:

- 3.2. Improved infant and young child feeding begins with ensuring the health and nutritional status of women, in their own right, throughout all stages of life and continues with women as providers for their children and families. Mothers and babies form an inseparable biological and social unit; the health and nutrition of one group cannot be divorced from the health and nutrition of the other (WHO 2003).
- 3.3. In areas in which health care is available and affordable, water is sanitary and families are able to afford the cost of purchasing artificial infant formula, the risks of not breastfeeding are still great – although not widely acknowledged. Infants fed formula are known to have depressed immune responses (Garofalo and Goldman 1999; Goldman 1993), higher incidence of obesity (Ravelli et al. 2000; Von Kries et al. 1993), greater risk of allergic disease/ asthma (Wright et al. 1995) and are more likely to suffer diarrhoea (Dewey et al. 1995; Pomkin et al. 1990), respiratory tract infection (Beaudry et al. 1995; Howie et al. 1990), otitis media (Aniansson et al. 1994; Duncan et al. 1999), pneumonia (Gessner et al. 1995; Levine et al. 1999), urinary infection (Pisacane et al. 1992; Marild 1990), type 1 and 2 diabetes (Gerstein 1994; Perez-Bravo et al. 1996; Pettitt et al. 1997), childhood cancer (Davis 1998; Shu et al. 1999; Smulevich et al. 1999) among other morbidity than breastfed babies (HHS 2000). Detrimental effects associated with not breastfeeding for women include slower uterine involution (Heinig 1997; IOM 1991), higher rates of breast cancer (Brinton et al. 1995; Enger et al. 1998; Marcus et al. 1999; Newcomb et al. 1994; Newcomb et al. 1999; Weiss et al. 1997), ovarian cancer (Gwinn et al. 1990; Rosenblatt et al. 1993) and slower postpartum weight loss (Dewey 2004; Kac et al. 2004).

4. Evolutionary Medicine on the Postnatal Ward

- 4.1. Our physical makeup has changed very little in the last 100,000 years and this short time span in evolutionary terms means that certain practices can clash with our physiology and expectations. It is not that people 'fail to progress' (phrase borrowed from disparaging birth terminology) to current conditions, but that, in the absence of strong selective pressures, changes occur over many generations. The vast array of discordances between operative delivery and 'expected' physical and social birth environments are an example of a context in which a myriad of obstacles exists for mothers, infants and those supporting them. For example, women in our postnatal interview study reported initiated breastfeeding after an extended period of time after caesarean surgery and recovery (including regaining consciousness after general anaesthesia). Nursing frequencies also indicated less attempted feeds than unmedicated infants might indicate (Ransjo-Arvidson et al. 2001; Riordan et al. 2000), contributing to the possibility of delayed onset of lactogenesis II and a lesser quantity of breast milk, instigating the 'need' for supplementation and early breastfeeding cessation.
- 4.2. Previous studies have demonstrated that caesarean section delivery impedes the successful achievement of early lactation and continued breastfeeding (Chapman and Perez-Escamilla 1999; Miovich et al. 1994; Patel et al 2003; Perez-Escamilla 1996; Rowe-Murray and Fisher 2002; Vestermark 1991). Our

pilot interview study investigated infant care after scheduled and unscheduled caesarean section delivery at a tertiary-level hospital in Newcastle-upon-Tyne, United Kingdom. Birth events, feeding strategies and the attitudes underlying them were explored in order to better understand how the operative mode of delivery impacts families' satisfaction with delivery, postnatal experiences, breastfeeding outcomes and home infant caretaking strategies. Documenting the process of recovery, maternal-infant bonding and infant care over an extended period of time will assist medical professionals in appropriately supporting this increasingly growing population.

4.3. The main objectives of this project were to ascertain the degree to which caesarean section affects a woman's prenatal intention to breastfeed her infant and assess the duration of any, and exclusive, breastfeeding among those mothers who initiated breastfeeding post caesarean section. Seventy-five caesarean section mothers were approached for recruitment on the postnatal ward on or after their second postnatal day when no medical professionals were present in their room from February to May 2006. In addition to the predictable maternal drowsiness from analgesics, incision soreness and learning how to care for their babies in general, mothers reported caesarean-related difficulties stemming from both them and their newborns. Anxiety over the lack of preparedness for operative delivery, strain of undergoing the abdominal surgery, delayed contact with baby, limited visiting hours and the perception an inadequate milk supply were self-reported troubles. The women also expressed concern regarding their infants' drowsiness, mucus in lungs, wheezing, inability to latch and lack of interest in feeding. After completion of the hospital interview, mothers who met the additional inclusion criteria of having delivered a single, full term infant (37 weeks or more gestation), initiated breastfeeding or expressing on the postnatal ward, and have little to no breastfeeding experience (not having previously breastfeed any children upon discharge from hospital) were invited to also participate in the telephone interviews. New information generated from this study will include the rate and timing of breastfeeding cessation among post caesarean section mothers and the range of events and attitudes reported for the discontinuance.

4.4. The next phase of caesarean section research will build upon previous studies conducted by our research team that examined the effects of infant sleep location on the post-natal ward (Ball and Ward-Platt submitted; Ball 2006). Sixty-one infants vaginally delivered without opiate analgesia to mothers who reported prenatal intention to breastfeed but had little or no prior breastfeeding experience took part at the same Newcastle hospital. Infants were randomised to one of three sleeping arrangements on the postnatal ward: standalone cot next to mother's bed-side; side-car crib (3-sided cot) attached to mother's bed; or infant in mother's bed with a side-rail attached. Infants in the standalone cot were observed attempting to feed and feeding successfully less often than those in both the side-car crib and maternal bed interventions, which allowed for direct physical contact (Ball and Ward-Platt submitted). There were no significant differences in feeding frequency measures between the bed and side-car conditions. Actively

facilitating nighttime maternal-infant access by increasing proximity and minimising physical barriers between mother and infant also led to significantly prolonged home duration of exclusive and any breastfeeding through the 16 week cut-off (Ball and Ward-Platt submitted).

4.5. As with the above-mentioned project, our upcoming trial will randomly allocate postnatal ward arrangements and include hospital interviews, nighttime video and audio recording of mother-infant behaviour and telephone interviews after hospital discharge. The side-car crib will be the only intervention to the standard standalone cot because of complications arising from impaired maternal awareness from birth analgesics and postnatal pain control and bedsharing. From January 2007 to December 2007, women with scheduled operative deliveries will be prenatally approached the Maternity Assessment Unit. The aim of this research is to compare the effect of two randomly allocated infant cot types, the side-car crib intervention to the standalone cot control, on breastfeeding initiation and infant safety during the postnatal stay as well as continued breastfeeding duration for caesarean section infants.

4.6. More information is available through the Durham Parent-Infant Sleep Laboratory website, <http://www.dur.ac.uk/sleep.lab/> and by contacting Chief Investigator Kristin Klingaman at kristin.klingaman@durham.ac.uk. Results of the caesarean section pilot interview study and the randomised controlled postnatal ward cot trial will be posted online.

5. Conclusion

5.1. Aspects of the current model of biomedicine in many contemporary western societies are at odds with evolved human characteristics. Families can especially benefit from an anthropological perspective on birth and breastfeeding because the processes unfold in the context of culturally influenced care. Evolutionary medicine elucidates the relationships between biological mechanisms and cultural practices to advance our knowledge of humanity and improve our daily experiences.

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