

Understanding and enabling breastfeeding in the context of maternal-infant needs

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Abstract

Understanding and enabling breastfeeding is a public health priority. Although rates of breastfeeding initiation are relatively high in Western countries, exclusivity and duration outcomes are far below public health recommendations and women's personal goals. In this chapter, we make the case for the use of multi-method research approaches to better understand infant feeding and women's health experiences in the first three months postpartum, which we conceptualize as the "4th Trimester." This transition period is characterized by interrelated maternal-infant health needs that require timely and integrated support. We offer a conceptual model of breastfeeding decisions. This contextual approach to infant feeding focuses on multi-directional influences and the dynamic nature of the balance between self and infant care that women experience over time. The main hypothesis generated from our framework suggests that simultaneously addressing breastfeeding costs and benefits, in relation to how they are experienced by mothers, will enhance the effectiveness of interventions aimed at supporting women to meet their goals. Mothers and their infants are dyads, but mother-infant conflict (as explained by evolutionary parental investment theory), and therefore maternal trade-offs, are also an inherent part of their relationships. Using our research on breastfeeding after childbirth via caesarean section, conversations-based breastfeeding counselling, and the development of infant side-car bassinets on the postnatal unit, we illustrate how a family-centered perspective that engages with the ways in which women might manage the costs of breastfeeding facilitates improvements in health care. Our studies indicate that we do women a disservice when we do not prepare them for 4th Trimester realities.

Introduction

Infant and young child feeding is the core of both maternal and child health. For infants, breastfeeding offers immune protection, complete nutrition, comfort, and a nourishing environment (AAP, 2012). For women, lactation is a predictable component of reproductive biology (Lawrence & Lawrence, 2005), is associated with positive health outcomes (Bartick et al., 2017b), and the breastfeeding relationship can be emotionally gratifying. Although rates of breastfeeding initiation are relatively high in the Western countries in which we have worked, exclusivity and duration outcomes fall far below public health recommendations and women's personal goals (Odom, Li, Scanlon, Perrine, & Grummer-Strawn, 2013). In the United States, 81.1% of US mothers initiate breastfeeding, by 6 months postpartum, only 51.8% are still breastfeeding, and at one-year, 30.7% of infants are breastfed (CDC, 2016). Only 22.3% of American infants exclusively receive their mothers' milk for the recommended 6 months. The United Kingdom displays a sharp drop-off in breastfeeding trajectories (Victora et al., 2016), which, like in the US, reflects significant disparities among sub-populations (CDC, 2013; NHS, 2014).

Our objective as applied/medical anthropologists is in generating evidence for practice and implementing sustainable programs to improve the health and well-being of women, infants, and those important to them. Broadly, we are interested in understanding and supporting new families. In Western settings and elsewhere, new mothers experience physical, emotional, and professional challenges that intersect with culture, lived experiences (such as stress and discrimination), and other roles as partners and professionals (Tully, Stuebe, & Verbiest, In Press). The comparative approach of anthropology offers a holistic perspective that helps us to step outside our culturally constructed understandings of optimal health care and parenting practices. With an awareness of cross-cultural, cross-species, and historical investigations, as well as an understanding of developmental processes in context, we are able to imagine how clinical settings and methods of care might differ. For example, we have used evolutionary perspectives and various theoretical frameworks to advance conversations on Sudden Infant Death Syndrome (Volpe et al 2013, Ball & Volpe, 2013) and the contributors to caesarean section delivery (Tully & Ball, 2013a). Further, we are trained in unique skill sets for advancing understanding and support for the complex, multi-level processes known to affect breastfeeding outcomes. In this chapter we describe a theoretical model for considering maternal decision-making regarding infant feeding in Western settings, as well as an exploration of our multi-method anthropological approach for understanding women's perinatal health experiences.

Within Western health care systems, significant variations exist in understandings of birth processes and maternal-infant needs; maternity experiences, parenting practices, and continuing patient care consequently vary in ways that directly impact health outcomes. At the core of these issues is equity – families experience differential access to health care, prioritize their needs differently and face different barriers to achieving personal goals. This focus on underlying contributors to health disparities is vital if we aim to implement programs that support marginalized groups, and thereby elevate care for all. This chapter is focused on translating biocultural perspectives into practice. Understanding and enabling breastfeeding is a public health priority, however mother-infant issues such as breastfeeding are poorly addressed by current systems of care that divide maternal and infant health care across multiple providers (Tully et al., In Press). Below we address strategies for optimizing knowledge and provide examples of ongoing implementation to advance patient-centered, family care where maternal and infant needs are considered holistically.

Modeling breastfeeding decisions

In considering infant feeding decisions, we have employed evolutionary theory to propose a new conceptual model for how breastfeeding costs and benefits are experienced by mothers, and might be manipulated to facilitate meeting their breastfeeding goals (Tully & Ball, 2013b). Infant feeding is one form of parental investment (Trivers 1972) that requires the investment of extensive maternal time and energy, limiting a mother's ability to use her time and energy for investment in herself, in other existing offspring, or in future reproductive opportunities. This has been the case throughout mammalian, primate, and hominin existence, although the interconnected physiological, psychological, and behavioral effects of the "4th Trimester" on human mothers (Kitzinger, 1975, Ball and Russell 2012) are often not recognized or supported in contemporary Western settings. A 4th Trimester perspective acknowledges that intensive caregiving is necessitated by infants' biological needs and requires substantial adjustments and sustained investment by primary caregivers, usually mothers. Infants are as dependent on their caregivers in the weeks and months after birth as they were leading up to delivery. Infants expect to be held and cared for, but our cultural ideology that infants function like little adults is generally mismatched to these needs (Russell, Volpe and Ball 2016). We do not sufficiently acknowledge and facilitate this transition period, in which mothers and infants shape one another's health and well-being (Verbiest, Tully, & Stuebe, In Press). Verbiest and colleagues (In Press) further describe that in practice, clinicians, home visitors, and other practitioners typically assess either the needs of the child or the needs of the woman; instead, we must consider these needs in the context of the dyad.

In both the UK and US, many women report having simultaneously positive and negative feelings about breastfeeding (Andrew & Harvey, 2011; Forster & McLachlan, 2010), illustrating that they are negotiating trade-offs over the course of infant and young child feeding. The multi-directional influences that contribute to women's strength of breastfeeding intent interact with factors affecting their perseverance (Tully & Ball, 2013b). Mothers can devote personal time and effort into breastfeeding their current infant, or they can employ alternate pathways that are less personally costly for infant feeding such as human milk substitutes, donor human milk, or wet nursing. The balance is influenced by factors both intrinsic and extrinsic to the mother-infant dyad. The economic concept of marginal returns is helpful here; in this case, marginal returns on breastfeeding 'investment' reflect the degree to which breastfeeding is 'worth it' in a given context (Tully & Ball, 2013b). For all women, there is theoretically a maximum 'profit' where the difference between the benefit to the infant and the cost to herself is greatest. The hypotheses generated from this model are: (1) reduction in maternal cost (real or perceived) promotes breastfeeding; (2) increase in infant benefit (or perception of benefit) promotes breastfeeding; and (3) reduction in maternal cost and increase in infant benefit (or perceptions thereof) will be more effective in supporting continued breastfeeding than addressing either maternal cost or infant benefit in isolation. We suggest (Tully & Ball, 2013b) that conceptualization of breastfeeding in the form of a cost-benefit model is a useful tool for consolidating existing knowledge and offering testable hypotheses for breastfeeding interventions.

Both infant and maternal factors matter for outcomes. The developmental science concept of equifinality (Cicchetti & Rogosch, 1996) is relevant to understanding breastfeeding trajectories because it identifies that the same end state (such as non-exclusive breastfeeding) can occur through a variety of different initial conditions (like reasons for breastfeeding intent) and through different processes (like the particular challenges mother-infant dyads face). Although there is clear evidence of the impact of various factors on initial infant feeding decisions, the reassessment of infant care motives and goals over time, and the weight of particular factors at different time points are less well explored (Tully & Ball, 2013b). As breastfeeding involves dynamic relationships within individual families, which occur in the context of differential support and changes in costs and benefits over time, this is an important focus for future research.

Obtaining data

Our expertise is in triangulating data to better understand health processes and outcomes in context. First, we directly engage with women to understand their breastfeeding experiences in their particular health care settings. For example, we conducted semi-structured interviews on a postnatal unit with women who had caesarean section childbirth to document their infant feeding experiences as the process unfolded. We found that women experienced breastfeeding as tiring and painful in the context of post-surgical recovery (Tully & Ball, 2014). Breastfeeding obstacles were interrelated and included maternal mobility limitations and positioning difficulties (due to abdominal surgery), and perception of limited infant interest in feeding.

Our engagement with participants revealed they were confused by the frequency of nocturnal infant wakings, leading many to conclude that their infants' frequent desire to feed indicated they were not producing sufficient milk for their infants' needs. In the US and UK, parents are commonly socialized to understand that 'good' babies sleep through the night and learn to self-soothe from an early age. This conceptualization perpetuates a cycle in which fragmented parental sleep is understood as reflecting infant sleep 'problems' (Ball 2013). However, frequent infant arousals and the need for close proximity over the course of 24-hours are both predictable and appropriate aspects of infant biology. The underlying issue is that nighttime parenting is exhausting for adults, who lack support, and often feel judged. Both parents and babies become pathologised by expectations that exist according to culturally specific ideologies surrounding parent-infant night-time behavior (Tomori 2014, Ball 2013). Such insight into maternal experiences is required to ensure breastfeeding support addresses the issues that are most salient to mothers at particular time points and for generating ideas of how to better structure health care.

Furthermore, in addition to using sleep diaries and interviews to gain subjective retrospective accounts of night-time infant care, we have pioneered prospective documentation of what happens in families' homes and postnatal units overnight via the use of infrared video-observation. This methodological technique uses continuous ethological coding of discrete and mutually exclusive behaviours using a computerized event recorder (Martin and Bateson, date) to provide an objective assessment of proximity, feed frequency, sleep duration, and interaction. We engage in establishing relationships with families during recruitment and through the research process to facilitate collecting what can be quite intimate data of nocturnal interactions during the sensitive, early postpartum period. These observational data are coupled with the longitudinal qualitative data, actigraphy, and a multitude of biological, psychological, and contextual measures, to explore how interactions such as nighttime infant risk scenarios unfold, and to assess bidirectional relationships such as infant and maternal contributions to infant sleeping and feeding patterns. This approach has improved understanding of nighttime infant waking and parental responses (e.g., Ball et al 2006; Tully & Ball, 2012; Volpe, Ball, & McKenna, 2013).

By designing studies to understand families' experiences as completely as possible, we obtain data that enable us to get closer to learning how practices impact infants and their caregivers on the multiple levels that we know contribute to health outcomes. Pairing time-linked video recordings with other measures facilitates direct comparison of various components of infant functioning in the context of maternal reports of infant temperament and behavior. In this way, variables of interest are understood in relation to each other and the limitations of each method are attenuated by the availability of complementary data. The value of this naturalistic, observational approach is increasingly being recognized, such as by the American Academy of Pediatrics (2016a). A deeper understanding of relative risk and benefits is needed to acknowledge the reality of health trade-offs, to promote safe sleep and optimal infant feeding and other interrelated health processes.

Propper and Tully are currently undertaking a longitudinal observational study of nighttime parenting with African American participants in North Carolina (NICHD R21HD077146). Behavioural

analyses of video observations in conjunction with biomarkers, and other data will examine the practices and rationale underlying the nighttime parenting behaviors of over 100 participant families from 3- to 9-month postpartum, in the context of their varied economic realities and experiences of stress and discrimination. This project is the first substantial example of overnight observational work with African Americans. These data from a community of mothers, partners, and grandmothers are crucial for facilitating deeper knowledge within this population. African Americans have the lowest breastfeeding uptake rates in the US (CDC, 2013). This infant feeding gap is critical in and of itself and suboptimal breastfeeding is associated with a greater burden of disease and a higher rate of sleep-related infant deaths for Black families than Whites (Bartick et al., 2017a).

Innovations in patient-centered care

Insight into mothers' experiences is required for evidence-based breastfeeding support and 'family-centered' care. We interpret maternal and infant needs as biosocial processes - cultural influences underlie the expectations, experiences, and interpretations of maternity care (Taylor, Tully, & Ball, 2016). For example, some of our study participants described formula supplementation as worthwhile to settle infants so that they would not be 'crying all night' in a shared post-natal ward setting where new mothers were anxious about their infants' cries disturbing the sleep of others (Tully & Ball, 2014). Mixed feeding human milk and formula on the postnatal unit has similarly been found to be associated with maternal desire for more rest in a Western setting by Pierro and colleagues (2016). Midwives and nurses have the opportunity to assist families in recognizing their interconnected breastfeeding obstacles and then work together to mutually construct strategies to balance maternal recovery and continued breastfeeding.

Conversation-based counselling: A recent systematic review found that the human element of prenatal counselling is crucial for breastfeeding outcomes (Wouk, Tully, & Lobbok, In Press). In the 4th Trimester Project, which is a Patient-Centered Outcomes Research Institute Engagement Award based at the University of North Carolina at Chapel Hill (EAIN-2603 PI Verbiest), mothers and other stakeholders suggest that written materials, online information, and texting programs should be integrated within health care practices so that providers not only direct women to these resources but also follow up on the topics (Tully et al., In Press). Patients should not be left to navigate health guidance or determine ways to achieve the goals given the reality of their lives without evidence-based support strategies.

Comprehensive prenatal education with continuity of support postpartum is recommended by the American College of Obstetrics and Gynecology (2016) and many other US health organizations (AAP, 2009; APHA, 2013) because of the need to maximize maternal preparedness for managing lactation physiology and the breastfeeding relationship. As there is no standardized US curriculum for Step 3 of the *Ten Steps to Successful Breastfeeding* (WHO, 2009), the Carolina Global Breastfeeding Institute developed Ready, Set, BABY (RSB) with support from the W. K. Kellogg Foundation. The RSB curriculum was developed to satisfy the requirements for Step 3 and also goes beyond this standard.

Ready, Set, BABY is currently one of the few existing conversation-based models in maternity and infant care. This tested resource (Parry, Tully, Hopper, Schildkamp, & Lobbok, Under Review) reflects current recommendations for prenatal education from the Baby Friendly Hospital Initiative, the Academy of Breastfeeding Medicine (Wood et al., 2009), as well as literature on why US breastfeeding women provide human milk substitutes or prematurely wean (Odom, et al., 2013; Kendall-Tackett, Cong, & Hale, 2011; Nommsen-Rivers et al., 2010; Nommsen-Rivers & Dewey, 2009; Li et al., 2008; Ahluwalia, Morrow, & Hsia, 2005). The RSB materials consist of a 28-page color patient booklet, an educator flipchart, and digital file. The educator flipchart includes suggested text for the provider to facilitate a conversation-based approach, to tailor the education to specific needs and contexts. RSB is

available in both English and Spanish. Images are culturally diverse and the readability level is at the 6th grade level. Each content topic is introduced with a question designed to engage the patient around the subject before the educator presents information. This approach enables the health care provider to tailor the discussion to the individual needs and interests of the mother and her family.

RSB is an evidence-based model for public health efforts to integrate the intersecting health behaviors, such as skin-to-skin contact and breastfeeding. Ready, Set, BABY is freely available for downloading, printing, and use (<http://breastfeeding.sph.unc.edu/prenatal-breastfeeding-education-tools-and-recommendations-for-action-links/>). There is an online orientation, as well as an Implementation Guide to facilitate in planning and execution. RSB wall posters for exam rooms and waiting areas are also provided by the Carolina Global Breastfeeding Institute. Tools like Ready, Set, BABY are vital because providing guidance in an empowering manner is complex. Tension exists between focusing on maternal adherence to clinical guidelines and supporting mothers to make informed decisions.

Tully and colleagues (In Press) assert that the way a mother parents is ultimately her decision, and such practices should be respected. Women may be aware of recommendations, such as solitary infant sleep, but adopt different practices for a variety of reasons. Prospective studies have documented that parent-infant bed sharing is more common than anticipated (Tully, Holditch-Davis, & Brandon, 2015; Ball et al., 1999). However, maternal and child health behaviors are often emotionally charged. When women know they are not meeting health care provider expectations, they may not bring up questions related to those issues to avoid conflict and when asked about practices directly, sometimes the response purposefully does not reflect their reality. Women may choose not to disclose the truth about issues such as infant sleep locations because they feel that the subsequent exchanges would be judgmental, rather than helpful (Tully et al., In Press; Tomori, Palmquist, & Dowling, 2016).

Infant side-car bassinets: Although allowing mothers and infants to share a postnatal unit or birthing center room is common practice in Europe, there is currently concern in the U.S. regarding whether rooming-in in the first days of postpartum life is acceptable and safe. Many individuals, including us, disagree with the premise that the way forward is to routinely separate mothers and their newborns. Wasser, Heinig, and Tully (2017) focus their response to this debate on identification of tools to better address the root concern: safe sleep and optimal infant feeding. The conundrum is that an implicit expectation of rooming-in is that mothers or their family member/s will perform all infant care-giving activities, particularly at night when minimal staff assistance is available, but hospital protocols may limit visitors. Further, the design of stand-alone bassinets that are currently almost universal on postnatal units impede maternal-infant access (Taylor et al., 2016). However, the constraints imposed by the furniture (four-sided acrylic tubs on wheeled carts) have been largely overlooked because breastfeeding, and parenting in general, is too often framed in a manner that compartmentalizes the infant and the breast – or views the infant and mother and separate individuals – instead of revolving around the relational and physiological connectedness between the mother and child dyad. As biological anthropologists, we approach mothers and infants as mutually-regulating physiological systems that have evolved to function in relation to each other. Therefore, clinical furniture, and other components of the postnatal unit setting, should be explicitly designed to meet the needs of mothers and their infants. Undermining the myriad of physical and emotional benefits of close maternal-newborn nighttime proximity, even when the efforts are well-intended, is not promoting health.

There are, however, areas for improvement. In an ongoing survey, Tully and colleagues found that some mothers delivering in U.S. hospitals ask for their infants to be taken out of their rooms and birthing facility staff also offer to remove the infants. Currently, 18.3% of live births in the U.S. are taking

place at facilities that have been designated as Baby-Friendly (CDC, 2009), expanded uptake of the *Ten Steps* is crucial because Pierro and colleagues (2016) documented that some U.S. postnatal unit staff offer formula to breastfeeding families. To understand the interrelated postnatal unit challenges, we have tested the impacts of infant side-car bassinets on the postnatal unit. Side-cars are three-sided and lock onto to the maternal hospital bed frame, keeping the newborn within the mother's reach and on the same level, without the dyad directly sharing the same surface (Figure 1). In England, we conducted studies to test the effects of the side-car bassinet, bed sharing, and stand-alone bassinet on postnatal unit breastfeeding frequency and other maternal-infant behaviors. The first randomized controlled trial was with women who underwent vaginal delivery, followed by a trial on postnatal unit bassinets after cesarean section. Our observational and qualitative findings suggest that the side-car bassinet arrangement improves breastfeeding and maternal satisfaction, while reducing infant handling risks and nursing staff time spent on non-medical needs (Ball et al., 2006; Taylor et al., 2016; Tully & Ball, 2012). Following unmedicated vaginal births mothers randomly allocated to sleep with their infants in bed-sharing and side-car crib conditions spontaneously assumed a side-lying position facing their baby and maintained this position, touching their baby throughout the night. The close proximity of mother and infant facilitated frequent breastfeeding as babies were easily able to alert their mothers that they were awake and seeking the breast (Ball et al 2006). In contrast mothers and babies who were allocated to sleep on separate surfaces with the baby in a stand-alone bassinet experienced far less breastfeeds and touching, with mothers sleeping through their infants' wakefulness and feeding cues, and exhibiting reduced responsivity (Ball et al 2006, Ball 2008).

We summarize the postnatal experiences of our participants in Taylor et al. (2016). In one case, a post c-section participant with the stand-alone bassinet breastfed her infant on pillows on her lap while in bed during the observation night. After the feed, she looked at the stand-alone bassinet that was adjacent to her hospital bed and then back at her now sleeping infant multiple times, debating whether to move her infant. She then fell asleep in that arrangement, waking later and moving her infant to the stand-alone bassinet. The difference in such unplanned bed sharing on the postnatal unit with the stand-alone bassinet is striking compared to our observations of bed sharing with the side-car, in which the dyad is in the 'breastsleeping' arrangement as characterised by McKenna and Gettler (2016).

Work to develop and implement side-cars in the U.S. is endorsed by the American Academy of Pediatrics. The clinical report "Safe Sleep and Skin-to-Skin Care in the Neonatal Period for Healthy Term Newborns" (AAP, 2016b) cites our work and recommends side-car bassinets as a tool for promoting infant safety while rooming-in. Tully is leading a design project with an interdisciplinary team of UNC Chapel Hill investigators, North Carolina State University Department of Industrial design faculty and graduate students, the North Carolina design firm Trig Innovation, and maternal and health care provider stakeholders to create a new side-car bassinet model for patent protection and then commercialization in the U.S.. The Carolina Global Breastfeeding Institute will also be offering technical support for implementation of the side-car bassinets within diverse clinical settings and populations. Although directly implementing research findings into practice is an exciting endeavour, anthropology provides a framework for asking why postnatal unit care is not already optimized for family wellness.

Conclusions

Training in anthropology and collaborating together in interdisciplinary teams enables collection of multiple types of data, so we can triangulate aspects of family experiences. Core to this process is observing mothers and their infants over time. Building upon existing theories also helps to frame and advance issues so we develop the most innovative, effective solutions. Improvements in patient-centered care have the potential to reduce disparities in postpartum complications and infant feeding

outcomes. Infant care includes inherently challenging processes that we strive to recognize and support. Human connection is vital for outcomes. A conversation-based approach facilitates relationships and trust. Further, open-ended questions lead to a discussion of the mothers' priorities. Additionally, women need support to achieve recommended postpartum outcomes, not just information on what guidelines are. Information and support should be addressed in the context of each woman's reproductive life plan. These discussions should begin during the prenatal period, so there is adequate time to understand and personalize plans to implement during the early postpartum period. Opportunities should be readily available for health care providers to access professional development on topics such as shared decision-making and to learn resources for obtaining the latest scientific information on the various dynamic fields of the 4th Trimester – particularly breastfeeding, which intersects with all other aspects of mom and baby needs. Some of the breastfeeding obstacles currently encountered are an iatrogenic consequence of the physical separation of mothers and infants. A priority for maternity care should be to promote wellness or at least not to get in the way of mother-newborn interactions.

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