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Human milk and breastfeeding: An intervention to mitigate toxic stress

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ABSTRACT

The American Academy of Nursing has identified toxic stress in childhood as a health policy concern of high priority. Adult diseases (e.g., obesity, diabetes, hypertension and cardiovascular disease) should be viewed as developmental disorders that begin early in life that could be reduced with the alleviation of toxic stress in childhood. The provision of human milk/breastfeeding is an evidence-based intervention that may hold the greatest potential to mitigate the effects of toxic stress from the moment of birth. Assisting families to make an informed choice to initiate and continue breastfeeding from birth has the potential to address both the disparity in the quality of nutrition provided infants and the economic stress experienced by families who purchase formula. The Expert Panel on Breastfeeding endorses initiatives to improve the initiation, duration, and exclusivity of breastfeeding to mitigate the effects of toxic stress in this call to action for research to build the evidence to support these critical relationships.

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The American Academy of Nursing has identified strategies to reduce the effects of toxic stress in childhood as a health policy concern (Mason, 2014). Nurses are well positioned to lead collaborative health policy and promotion efforts to reduce toxic stress in childhood. Evidence suggests that early exposure to prolonged toxic stress interrupts developing brain architecture in infants and young children with effects that may persist into adulthood (Shonkoff & Garner, 2012). Hence, chronic adult diseases (e.g., obesity, diabetes, hypertension and cardiovascular disease) may begin early in life and may be viewed as developmental disorders that have the potential of being reduced with the alleviation of toxic stress (Shonkoff & Garner, 2012).

Toxic stress is defined as the prolonged activation of stress responses in the body due to ongoing stressors (e.g., abuse and neglect) that occur in the absence of the buffering protection of a supportive adult relationship during early childhood (Shonkoff & Garner, 2012). Responsive relationships between adults and their children may develop immediately after birth through skin-to-skin contact when a mother places her naked infant on her bare chest. This initiates a cascade of chemical and hormonal responses that stimulate a rise

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in maternal oxytocin and prolactin and decreases in cortisol which stabilize the infant's allostatic load by promoting thermoregulation, stimulating human milk production, reducing overall stress, and inducing calm (Buckley, 2015; Charpak et al., 2005; Moore, Anderson, Bergman, & Dowswell, 2012; Stevens, Schmied, Burns, & Dahlen, 2014). The hormonal responses that underlie fundamental maternal–infant interactions related to childbearing have evolved over millions of years to optimize reproductive success of the human species (Buckley, 2015). Although evidence from animal studies continue to provide the basis for our understanding of these relationships, humans share common chemical pathways between the brain, neuroendocrine, and immune systems that respond to external stimuli and maternal–infant behaviors that are similar among mammals (Buckley, 2015; Johnson, Riley, Granger, & Riis, 2013; Moore et al., 2012). Skin-to-skin contact at birth is a fundamental maternal–infant interaction and may be viewed as the cornerstone of parental behaviors that support infant brain, physical and emotional infant development, and maternal–infant attachment (Buckley, 2015; Charpak et al., 2005; Moore et al., 2012; Stevens et al., 2014). Without establishment of these types of initial maternal–infant responsive behaviors, a child's development and well-being, may be seriously threatened (Johnson et al., 2013; Shonkoff & Garner, 2012). Even when there is no apparent physical harm, the extended absence of an adult response to an infant or young child's behavioral cues (e.g., crying, hunger) activates the stress response system (Shonkoff & Garner, 2012).

Breastfeeding is an evidence-based intervention that forms basic, essential, responsive relationships between infants and mothers and may hold the greatest potential to mitigate the effects of toxic stress from the moment of birth (Carling, Demment, Kjolhede, & Olson, 2015; Martin, Gunnell, & Smith, 2005; Owen, Martin, Whincup, Smith, & Cook, 2006; U. S. Department of Health and Human Services, 2011; Yan, Liu, Zhu, Huang, & Wang, 2014). Nurses play a critical role in hospital and community settings where they provide care and support essential to ensuring that mothers are able to provide human milk and/or breastfeed their infants (Hallowell, Spatz, Hanlon, Rogowski, & Lake, 2014; Spatz, 2004). This call to action describes current evidence that supports the potential for the provision of human milk and breastfeeding to mitigate the harmful effects of toxic stress and highlights areas where research may be focused to build the evidence to support the critical socioeconomic, behavioral, and biologic outcomes related to breastfeeding and the provision of human milk to newborn infants.

Background

Human milk has been recommended as the sole means of infant nutrition for the first 6 months of life. Despite current organizational support for breastfeeding and the endorsement from numerous prominent organizations of health professionals to breastfeed through the 12 months of life, less than 19% of infants in the United States are exclusively breastfed beyond 6 months (American Academy of Family Physicians, 2007; American Academy of Pediatrics—Section on Breastfeeding, 2012; American College of Nurse-Midwives, 2011; Centers for Disease Control and Prevention, 2014; Committee on Health Care for Underserved Women, American College of Obstetricians and Gynecologists, 2007; Lessen & Kavanagh, 2015; United Nations Children's Fund, 2003; World Health Organization, 2001). Hence, 80% of infants in the United States are receiving suboptimal nutrition very early in life, exposing them to higher risks of morbidity and poorer neurodevelopmental outcomes in early childhood (Ip et al., 2007; Owen et al., 2006).

Toxic stress is defined by the lack of an appropriate adult response to intervene for a child with prolonged exposure to stressful situations (Garner et al., 2012; National Scientific Council on the Developing Child, 2012; Shonkoff & Garner, 2012). The provision of human milk/breastfeeding provides the opportunity for mothers to consistently respond to their infant's most basic experiences of stress from birth and may be a mitigating intervention to reduce toxic stress encountered during infancy and early childhood.

Types of Stress Experienced in Early Childhood

It is important to distinguish among three types of stress: positive, tolerable, and toxic. From the moment of birth, infants experience positive stress or circumstances characterized by brief, mild-to-moderate, and short-lived physiologic states (e.g., dealing with frustration due to the need to be fed or held; National Scientific Council on the Developing Child, 2012). These brief and temporary experiences trigger the brain and body to respond with an adrenaline rush and increased heart rate and stress hormone levels (National Scientific Council on the Developing Child, 2012). Exposure to positive stress is vital to human development and teaches children how to adapt, developing necessary coping skills that foster resilience (National Scientific Council on the Developing Child, 2012; Shonkoff & Garner, 2012). When this type of stress occurs within the context of a stable and supportive relationship between a responsive adult and a child, it builds a secure foundation on which children may learn to exhibit healthy responses to stressful situations (National Scientific Council on the Developing Child, 2012; Shonkoff & Garner, 2012).

In contrast, tolerable stress events (e.g., parental divorce) may occur with intensity but are time limited, allowing the brain time to recover (National Scientific Council on the Developing Child, 2012; Shonkoff &