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Neonatal pain and reduced maternal care: Early-life stressors interacting to impact brain and behavioral development.

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Abstract

Advances in neonatal intensive care units (NICUs) have drastically increased the survival chances of preterm infants. However, preterm infants are still exposed to a wide range of stressors during their stay in the NICU, which include painful procedures and reduced **maternal** contact. The activation of the hypothalamic-pituitary-adrenal (HPA) axis, in response to these stressors during this critical period of **brain** development, has been associated with many acute and long-term adverse biobehavioral outcomes. Recent research has shown that Kangaroo care, a non-pharmacological analgesic based on increased skin-to-skin contact between the neonate and the mother, negates the adverse outcomes associated with neonatal pain and reduced **maternal** care, however the biological mechanism remains widely unknown. This review summarizes findings from both **human** and rodent literature investigating neonatal pain and reduced **maternal** care independently, primarily focusing on the role of the HPA axis and biobehavioral outcomes. The physiological and positive outcomes of Kangaroo care will also be discussed in terms of how dampening of the HPA axis response to neonatal pain and increased **maternal** care may account for positive outcomes associated with Kangaroo care.

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KEYWORDS: Kangaroo care; NICU painful procedures; early-life adversity; hypothalamic–pituitary–adrenal axis (HPA); **maternal separation**; preterm infants

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