Stress As a Link Between Childhood Trauma and Preterm Delivery

Moira Szilagyi, MD, PhD

In an intriguing article by Liu et al,[1] "Out-of-Home Care and Subsequent Preterm Delivery: An Intergenerational Cohort Study," in the current issue of *Pediatrics*, the authors report on the elevated rates of preterm delivery among women with a history of out-of-home care (OHC) before and after the age of 10 years. The authors framed their study using the science of toxic stress and its known impact on health outcomes as the theoretical construct and using OHC as a proxy for early life adversity. Based in Sweden, this study reinforces the value of large national birth cohort databases and linked data sets using unique identifiers in evaluating the impact of population-level health risk factors on outcomes. This approach enabled the authors to study a variety of maternal psychosocial, health, mental health, and perinatal risk factors and arrive at the conclusion that maternal childhood adversity made a moderate contribution to the risk for preterm delivery over and above those other factors. The complex ways in which childhood adversity negatively impacts long-term health and well-being are still being unraveled but are important to understand in terms of opportunities for prevention and intervention.

In the initial Adverse Childhood Experiences studies by Felitti et al,[2] the authors postulated that the impact of early childhood adversities on poor long-term health was mediated by the adoption of health-risk behaviors, such as substance abuse. However, this did not fully explain the dose-response curve and why some individuals who did not engage in risky behaviors still had poor outcomes.

In an oversimplified schematic, the authors note that significant stressors in the absence of buffering lead to the dysregulation of the neurohormonal stress response, altering gene expression (epigenetics), which results in changes in brain architecture and function, increased inflammation, and suppression of humoral immunity.[3] Accumulated adversities in childhood and adolescence are particularly devastating because they occur during the most rapid and critical periods of brain development. Cumulative traumatic experiences create wear and tear on the organism, even in the absence of risky health behaviors, so that trauma can become biologically embedded.[4] In addition, inflammation is emerging as one of the major pathways by which trauma leads to medical problems.[5]

The study by Liu et al[1] essentially covered 3 generations of women in the same families and reinforces the concept of the intergenerational transmission of adversity and poor health outcomes. The limited data available for the grandparent (generation 0) generation showed that mothers were more likely to be young, of low socioeconomic status, foreign, and have hypertension during pregnancy. Extensive data for the next generation (generation 1) revealed that those mothers who spent time in OHC were more likely to be younger at delivery, of lower socioeconomic status, multiparous, have abused tobacco or alcohol, and have more pregnancy complications than women

Department of Pediatrics, Mattel Children's Hospital, University of California, Los Angeles, Los Angeles, California

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Address correspondence to Moira Szilagyi, MD, PhD, Division of General Pediatrics, Department of Pediatrics, University of California at Los Angeles, 300 Medical Plaza, Room 3-334, Los Angeles, CA 90095. E-mail: mszilagyi@mednet.ucla.edu

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who had no OHC experience. The authors theorize that cumulative childhood adversities may wield their impact on preterm birth through health-risk behaviors and through changes in the hypothalamic-pituitary axis, which plays an integral role in initiating parturition. However, labor and parturition are also inflammatory processes,[6] raising the intriguing question of whether the elevated risk of preterm delivery in women with early life adversities may be partly mediated through inflammatory pathways.

In Liu et al's study,[1] the accumulation of adversities over the life span in generation 1 fits another concept in life-course science: that of developmental cascades. In this concept, risk often begets risk, leading to an ever-increasing burden of adversities that erode resilience over time. The authors note that OHC was associated with a variety of other adversities in later life that probably followed a chain of risk events in childhood and adolescence. In contrast to this negative developmental cascade, the resilience literature indicates that it is likely that competence begets competence and that early, well-timed interventions can interrupt the cascade and shift the trajectory toward better outcomes.[7]

What does all of this hypothesizing mean for pediatricians? This large population study adds to the science that is sounding the alarm for all child-serving professionals and policy makers about childhood trauma and its devastating impacts. If we are to reduce the burden and cost of poor short- and long-term health, mental health, educational, developmental, and social outcomes, we need to identify children and families at risk as early as possible and intervene in ways that reduce adversities and promote resilience and health. Pediatricians have a special role to play with individual families. We are the first child experts who most families encounter, and we may take care of generations of the same family over time. We are experts in medicine, prevention, child development, and parenting. We can identify families and children at risk by familiarizing ourselves with trauma symptoms and conducting surveillance and screenings. We are in the business of resilience promotion through the advice and guidance we offer families, our focus on family and child strengths, and engaging community partners to intervene early by connecting families to services that promote resilience and ameliorate the effects of adversity. The results of this study indicate that the cost is high if we fail to identify and intervene with families and children who are at the highest risk, such as those in OHC, to shift trajectories. But many of the adversities families experience are upstream and will require us to form collaborative partnerships outside of our offices to promote safe and effective communities, educational systems, and child care settings.[8]

ABBREVIATION

OHC: out-of-home care

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