

The Impact of ACEs on Individuals and Nurses

Written by Maria Vinall

The Adverse Childhood Experiences Study is a long-term research effort started in the 1990s to understand the impact of childhood trauma on health, social, and economic outcomes. The study is a collaborative effort between the US Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia, and Kaiser Permanente's Health Appraisal Clinic in San Diego, California. Three presenters—Joy A. Lauerer, DNP, PMHCNS-BC, Medical University of South Carolina, Columbia, South Carolina, USA, Colleen C. Williams, DNP, FPMHNP-BC, Sea Mar Community Health Centers, Mount Vernon, Washington, USA, and Kathleen C. Gaffney, PMHCNS, CPNP, University of Tennessee Health Science Center, Memphis, Tennessee, USA—reviewed how the too-often invisible nature of childhood trauma can change a child's epigenome early in life, leading to physical and mental health problems throughout the child's lifetime.

The study included 26 229 individuals in 5 states who were interviewed by phone using the 2009 adverse childhood experience (ACE) module of the Behavioral Risk Factor Surveillance System. The study results indicated that 59.4% of the respondents had at least 1 ACE and 8.7% had ≥ 5 ACEs. ACEs were linked to a range of negative health outcomes in adulthood, including substance abuse, depression, cardiovascular disease, diabetes, cancer, and premature mortality [CDC. *MMWR Morb Mortal Wkly Rep.* 2010]. ACEs have also been associated with self-reported sleep disturbances in adulthood [Chapman DP et al. *Sleep Med.* 2011] and a higher incidence of being a smoker [Ford ES et al. *Prev Med.* 2011] or having frequent headaches [Anda R et al. *Headache.* 2010]. The ACE pyramid shows the progression of the adverse childhood event from conception to death (Figure 1).

Epigenetics refers to influences on the phenotype operating above the level of the genetic code itself that includes DNA methylation, covalent histone modification, and noncoding RNA. Evidence suggests that epigenetic remodeling occurs during early development in response to environmental events to produce individual differences in gene expression of specific traits. These functionally relevant modifications to the genome do not involve a change in nucleotide sequence [Bagot RC, Meaney MJ. *J Am Acad Child Adolesc Psychiatry.* 2010]. The embryonic physiologic changes created by negative events can change the chemistry that encodes the genes in brain, cardiac, ocular, auditory, and skeletal cells resulting in birth defects. The effects of maternal stress are not confined to the first generation but can extend over multiple generations [Matthews SG, Phillips DI. *Exp Neurol.* 2012].

Alcohol use during pregnancy can be thought of as an early ACE, affecting developmental processes from conception onward. Alcohol can interfere with the normal proliferation of nerve cells, the formation of axons, the pathways of biochemical and electrical signals within a cell, the regulation of calcium levels in the cell, and the expression of certain genes that produce or regulate cell growth, division, and survival. Alcohol produces the most serious neurobehavioral effects in the fetus, yet only 1 in 6 adults has ever had a health professional ask them about alcohol use [CDC. CS244613B. 2014]. Fetal alcohol spectrum disorders (FASDs) affect an estimated 40 000 newborns each year in the United States and are the leading known cause of preventable intellectual disability. Besides intellectual problems, FASDs can cause poor coordination, hyperactive behavior, problems with sleep and sucking, reasoning and judgment skills, and vision and hearing and can create difficulties with social relationships. However, nurses should be aware that early detection is critical and that people with FASDs can grow, improve, and function well with proper support.

Neuroplasticity refers to the ability of the neural pathways and synapses to change in response to changes in behavior, thinking, emotions, and the environment. Such neuroplasticity is evident in epidemiologic and neurobiological data showing that childhood stress has a dose-response-like

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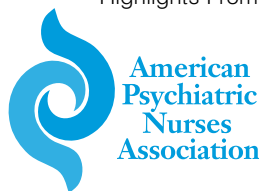
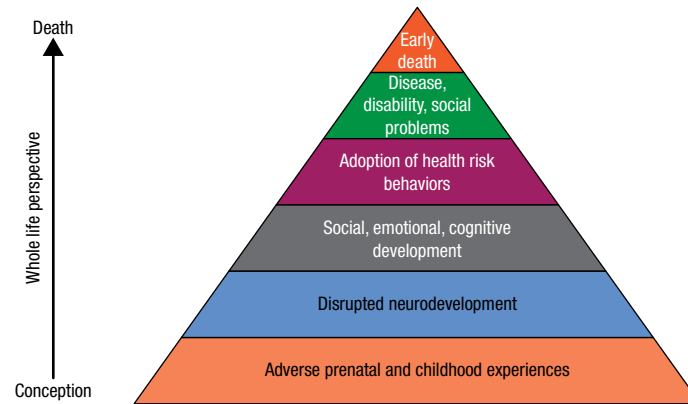


Figure 1. Adverse Childhood Experience Pyramid



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relationship with impairment in brain structures and functions as well as outcomes [Anda RF et al. *Eur Arch Psychiatry Clin Neurosci*. 2006]. Posttraumatic stress disorder (PTSD) is associated with changes in the medial prefrontal cortex, hippocampus, and amygdala areas of the brain. Stress is also related to aggressive behaviors in school-aged children when the child reacts aggressively due to a negative worldview and faulty brain development. The fight, flight, or freeze response is expressed as aggressive behavior.

If there is no intervention, the effects of trauma and chronic stress can affect every development stage, including the child's emotional attachments, behavioral control, cognition, and self-concept. Overeating, substance abuse, depression, mood disorders, and suicide attempts are common as the stressed child ages into adolescence and adulthood. Early intervention is best, but each developmental stage offers an opportunity for intervention.

Nurses should be informed and should provide care with a trauma-informed approach based on emerging research from the fields of genetics, epigenetics, and the promise of neuroplasticity. This can start with a

thorough psychosocial history that includes asking questions regarding prenatal exposure to alcohol, drugs, and environmental stressors. The ACE and resilience questionnaires can be used to establish a baseline. Change and healing can be promoted with body-, cognitive-, and trauma-focused therapies. Teaching self-care, self-regulation, and coping skills can improve patient self-control. Brain neuroplasticity allows the healthy as well as the impaired to benefit from cognitive training programs. Psychopharmacology is available that can target neurotransmitter dysregulation, stabilize mood, correct metabolic disorders, and ameliorate PTSD nightmares and depression. Nurses need to teach that all emotions can be managed, negotiated, and integrated as part of the healing experience.

With this expanded knowledge, nurses can and must assess for a history of prenatal alcohol exposure and childhood trauma and then diagnose and treat using individualized, person-centered, evidence-based practice. The objective should be to promote resilience and empower individuals to improve their health outcomes, despite the lack of rigorously evaluated programs.

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