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The enduring effects of abuse and related adverse experiences in childhood. A convergence of evidence from neurobiology and epidemiology.

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Abstract

BACKGROUND:

Childhood maltreatment has been linked to a variety of changes in brain structure and function and stress-responsive neurobiological systems. Epidemiological studies have documented the impact of childhood maltreatment on health and emotional well-being.

METHODS:

After a brief review of the neurobiology of childhood trauma, we use the Adverse Childhood Experiences (ACE) Study as an epidemiological "case example" of the convergence between epidemiologic and neurobiological evidence of the effects of childhood trauma. The ACE Study included 17,337 adult HMO members and assessed 8 adverse childhood experiences (ACEs) including abuse, witnessing domestic violence, and serious household dysfunction. We used the number of ACEs (ACE score) as a measure of cumulative childhood stress and hypothesized a "dose-response" relationship of the ACE score to 18 selected outcomes and to the total number of these outcomes (comorbidity).

RESULTS:

Based upon logistic regression analysis, the risk of every outcome in the affective, somatic, substance abuse, memory, sexual, and aggression-related domains increased in a graded fashion as the ACE score increased ($P < 0.001$). The mean number of comorbid outcomes tripled across the range of the ACE score.

CONCLUSIONS:

The graded relationship of the ACE score to 18 different outcomes in multiple domains theoretically parallels the cumulative exposure of the developing brain to the stress response with resulting impairment in multiple brain structures and functions.

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