

Comparison of associations between childhood adversity and behavioral, neurological, and developmental conditions among U.S. children

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Objective

There is a large body of evidence suggesting that childhood trauma and toxic stress can lead to a myriad of subsequent short- and long-term behavioral, developmental, and physical health problems. Stressful life events in children, specifically adverse childhood experiences (ACEs) and subsequent functional and structural brain changes in response to stress, have been associated with the development of behavioral and developmental health conditions including attention-deficit/hyperactivity disorder (ADHD), substance abuse, depression, anxiety, intellectual disability (ID), autism spectrum disorder (ASD), and other health conditions. We therefore compared the associations between parent-reported childhood adversity and a range of common childhood behavioral, developmental, and neurological health conditions in a large population-based study.

Methods

We analyzed data from 102,341 children aged between 3 and 17 years who participated in the National Survey of Children's Health 2016-2018, a nationally representative survey of children living in the United States (US). Parent-reported diagnoses (at any point in time) of fifteen behavioral, developmental, and physical health conditions and nine household challenge ACEs (including parental separation, death or incarceration; or family violence, mental illness or substance abuse) were defined by questionnaire response. Logistic regression with sample weights was used to estimate the odds ratio (OR) and 95% confidence interval (CI) for each health condition by number of reported ACEs (1, 2, or ≥ 3). The dose-response nature of the ACE score for each condition was determined by comparing the logistic regression coefficients and corresponding odds ratios across the number of ACEs reported for each health condition. The point estimates were rank-ordered, and then clustered into groups with *k*-means clustering revealing three distinct groups: health conditions with an overall low ($OR < 1.35$), intermediate ($1.35 \leq OR < 1.80$), or high ($OR \geq 1.80$) strength of association between ACE exposures and the health conditions.

Results

Of the surveyed conditions belonging to the lowest strength of association group, a diagnosis of Down Syndrome, Tourette Syndrome, or Cerebral Palsy was not associated with reported household challenge ACEs, in adjusted analyses. In contrast, behavior or conduct problems, depression, and substance abuse were all strongly associated with household challenge ACEs, showing the highest adjusted odds ratios. Conditions belonging to the intermediate group (which included ASD, ID, severe/frequent headaches, developmental delay, learning disability, ADHD, and anxiety) showed increasing prevalence as the number of ACEs increased, and statistically significant adjusted ORs.

Conclusions

In a nationally representative sample of U.S. children, we found a significant association between childhood adversity and multiple parent-reported diagnoses of developmental, behavioral, and neurological health conditions in varying magnitudes with respect to the cumulative effect of adversity and the overall dose-response nature.