

The Relative Contributions of Adverse Childhood Experiences and Healthy Environments to Child Flourishing in Delaware

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According to the 2011-2012 National Survey of Children's Health, 47.9% of children nationwide were exposed to at least one Adverse Childhood Experience (ACE).¹ ACEs are potentially traumatic events that occur prior to the age of 18 and which, in the absence of adequate support, create toxic stress which disrupts normal brain development. Over the years, multiple studies have indicated that individuals exposed to childhood adversity have increased likelihood of engaging in health risk behaviors and higher disease morbidity later in life.²⁻¹² Cumulative ACE exposure (4 or more ACEs) has been linked to various health, social, and behavioral issues such as chronic health conditions, depression, and premature death.^{2,4-12}

The 1992-1995 pioneering ACE study conducted as a collaboration between the Centers for Disease Control and Prevention (CDC) and Kaiser Permanente's Health Appraisal Clinic demonstrated numerous associations between the exposure to ACEs with the prevalence of risk factors and diseases in adulthood.⁸ The study found a dose-response relationship between exposure and impact on health; participants with higher ACE exposure were more likely to develop chronic diseases including obesity, chronic headaches, ischemic heart disease, chronic obstructive pulmonary disease, and autoimmune disease.⁸ There were also increased psychosocial risks of depression, alcoholism, homelessness, suicide attempts, illicit drug use and tobacco use.⁸

While prior research focused mainly on ACEs and adult health and wellbeing, more recent studies are beginning to look at the number and types of ACEs and a variety of outcomes related to child health and well-being.¹³⁻¹⁵ Little is known about the immediate impact ACEs have on flourishing behaviors among children. ACEs may affect a child's ability to flourish, especially among children who experience more than one adverse event. Understanding these effects of exposure to ACEs during childhood can promote early interventions to prevent long-term adverse health outcomes and help improve children's ability to thrive despite ACE exposure. The primary objective of this study was to test the relationship between the number of ACEs and a measure of child well-being among Delaware children under the age of 18. Additionally, we examined whether, in the context of ACE exposure, there were factors which diminished or enhanced child well-being.

METHODS

Study Population

We performed a secondary data analysis on the 2011-2012 National Survey of Children's Health (NSCH), a national telephone survey conducted by the CDC's National Center for Health

Statistics (NCHS) on households with children aged 0-17. NCHS provides rich data on multiple, intersecting aspects of children’s lives—including physical, emotional, and behavioral health indicators, access to quality health care, and the child’s family, neighborhood, school, and social context. The study sample size was limited to only include Delaware residents.

Outcome Variables

Our primary outcome of interest was child flourishing. Child flourishing was defined as usually or always having several NCHS indicators based on the child’s age.¹⁶ For children 0-5 years old, indicators of child flourishing included the following: usually or always being affectionate and tender with a parent, bouncing back quickly when things don’t go his or her way, showing interest in learning new things, and smiling and laughing a lot. For children 6-17 years old, flourishing indicators included the following: usually or always finishing tasks and following through with plans, staying calm and in control when faced with a challenge and showing interest and curiosity in learning new things.

Independent Variables

Demographic variables included age, race/ethnicity, and income. Age was classified as 0-5 years old and 6-17 years old; race/ethnicity was grouped as white non-Hispanic, black non-Hispanic, Hispanic/Latino, and other. Income was based on the State Children’s Health Insurance Program (SCHIP) income groups and categorized as household income below 200% Federal Poverty Level (FPL) and at or above 200% FPL.¹⁶

Parental factors included overall parental health and parental stress. All health status questions were self-reported and considered excellent if the child’s mother or father responded “Excellent” or “Very Good” to all emotional and physical health indicator questions. Parental stress was defined as children whose parents “Usually” or “Always” experienced stress from parenting.

Neighborhood factors such as a neighborhood support, neighborhood amenities, neighborhood safety, and neighborhood risks were also quantified. A child’s neighborhood was considered supportive if parents indicated having people in the neighborhood who helped each other out, people in the neighborhood who watched each other’s children, people in the neighborhood who they trusted to help with their child, and people in the neighborhood they could count on. Positive neighborhood amenities were indicated if neighborhoods had sidewalks, a library, park, and recreation center. Neighborhood risks were indicated if a neighborhood had any litter, dilapidated housing, broken windows, or graffiti.

There were nine ACEs included in the NSCH:

1. Economic hardship,
2. Divorce/separation of parent,
3. Incarceration of parent,
4. Death of parent,
5. Household mental illness,
6. Household alcohol or drug abuse,
7. Witness of domestic violence,

8. Witness/victim of neighborhood violence, and
9. Victim of racial discrimination.

ACEs were grouped as 0-1 ACE exposure, and 2 or more ACE exposure.

Statistical Analysis

We examined each ACE category stratified by race/ethnicity using a chi-square test. The relationship between the ACE score and child flourishing was also analyzed using univariable analysis. A multivariable logistic regression model was used to determine the odds of a child flourishing when exposed to 0-1 ACEs versus 2 or more, adjusting for demographic, parental factors, and neighborhood characteristics. Statistical analyses were conducted using SAS 9.3.

RESULTS

Our cohort included 1,824 Delaware children between the ages of 0-17 years old of whom 70.1% were between the ages of 6 and 17, 57.7% were non-Hispanic white, and 68.5% were at or above 200% FPL. [Table 1]. Of the total population, 1,383 (75.8%) children had less than 2 ACE exposures and 371 had 2 or more. Among Delaware children who were exposed to 0-1 ACEs, prevalence of flourishing was at 61.2%. However, the prevalence decreased by about 20% for children exposed to 2 or more ACEs, with only 41.0% of these children reported to be flourishing.

Table 1. Demographic characteristics of Delaware children 0-17 years old, National Survey of Children's Health, 2011-2012 (N=1,824).

| | Total N (%) | Flourishing Measure Not Met (%) | Flourishing Measure Met (%) |
|--------------------------------------|-------------|---------------------------------|-----------------------------|
| Age (years) | | | |
| 0-5 | 497 | 21.5 | 78.5 |
| 6-17 | 1278 | 51.4 | 48.6 |
| Race/Ethnicity | | | |
| White, NH | 1053 | 39.5 | 60.5 |
| Black, NH | 275 | 52.7 | 47.3 |
| Hispanic | 198 | 45.5 | 54.6 |
| Other | 204 | 44.1 | 55.9 |
| % Federal Poverty Level (FPL) | | | |
| Below 200% FPL | 525 | 40.1 | 59.9 |
| At or above 200% FPL | 1250 | 40.1 | 59.9 |
| Number of ACEs | | | |
| 0-1 ACEs | 1383 | 38.8 | 61.2 |
| 2 or more ACEs | 371 | 59.0 | 41.0 |

Factors Associated with Child's Flourishing

In multivariable analyses, child flourishing showed the strongest decrease with the following: exposure to 2 or more ACEs (AOR 0.65, 95% CI 0.48 – 0.86), Black, non-Hispanic (AOR 0.61, 95% CI 0.44 – 0.84), and older child age (AOR 0.27, 95% CI 0.21 – 0.36) [Table 2]. There was no significant association between household income and child flourishing. All parental factors impacted flourishing. Children of parents with excellent overall health (AOR 1.68, 95% CI 1.31 – 2.16) and limited parental stress (AOR 4.44, 95% CI 2.90 – 6.81) were more likely to flourish. While all neighborhood factors increased the odds of a child flourishing, neighborhood safety had the most significant impact on flourishing. Children who lived in safer neighborhoods were more likely to flourish than children or their caregivers reported feeling unsafe (AOR 1.72 95% CI 1.17 – 2.52).

Table 2. Factors associated with child's flourishing among Delaware children, National Survey of Children's Health, 2011-2012.

| | AOR (95% CI) | p-value |
|-------------------------------------|--------------------|---------|
| ACE Exposure | | |
| 0-1 ACE | 1.00 [reference] | |
| 2 or more ACEs | 0.65 (0.48 - 0.86) | 0.003 |
| Age (years) | | |
| 0-5 | 1.00 [reference] | |
| 6-17 | 0.27 (0.21 - 0.36) | <.0001 |
| Race/Ethnicity | | |
| White, Non-Hispanic | 1.00 [reference] | |
| Black, Non-Hispanic | 0.61 (0.44 - 0.84) | 0.012 |
| Hispanic | 0.96 (0.66 - 1.39) | 0.327 |
| Other/Multi-racial | 0.83 (0.58-1.18) | 0.974 |
| Income | | |
| At or above 200% FPL | 1.00 [reference] | |
| Below 200% FPL | 0.95 (0.72 - 1.26) | 0.716 |
| Parental Health | | |
| Poor Emotional/Physical Health | 1.00 [reference] | |
| Excellent Emotional/Physical Health | 1.68 (1.31 - 2.16) | <.0001 |
| Parental Stress | | |
| Never/Rarely | 1.00 [reference] | |
| Usually/Always | 4.44 (2.90 - 6.81) | <.0001 |
| Neighborhood Risks | | |
| No | 1.03 (0.78 -1.35) | 0.838 |

| | | |
|--|--------------------|-------|
| Yes | 1.00 [reference] | |
| Neighborhood Amenities | | |
| No | 1.00 [reference] | |
| Yes | 1.24 (0.97 - 1.58) | 0.083 |
| Neighborhood Supports | | |
| No | 1.00 [reference] | |
| Yes | 1.28 (0.92 - 1.77) | 0.147 |
| Neighborhood Safety | | |
| No | 1.00 [reference] | |
| Yes | 1.72 (1.17 - 2.52) | 0.005 |
| AOR, adjusted odds ratio; CI, confidence interval; UOR, unadjusted odds ratio; FPL, Federal Poverty Level. | | |

DISCUSSION

The present study adds to the emerging literature on the impact ACEs have on child health outcomes, and goes further in identifying protective factors that can help children thrive even in the context of ACEs exposure. As few as two adverse childhood experiences was significantly associated with a child's ability to flourish. Parental well-being and neighborhood factors play an important role in determining flourishing amongst children. Children with ACE exposure who flourished were significantly more likely to have parents with excellent physical and emotional health, parents who were less stressed, and those who lived in a safe neighborhood.

Early and regular screening of children for ACE exposure could help identify those who may be in need of interventions to promote flourishing. Routine screening of children for ACE exposure positions primary care providers to intervene and assist families with leveraging family and neighborhood strengths specific to their needs. While many providers may not feel comfortable asking families questions related to childhood trauma and adversity and families may be reluctant to share sensitive information, the American Academy of Pediatrics (AAP) provides guidelines to help pediatric practices effectively create a medical home that addresses ACEs.¹⁷ Approaching the new process as a quality improvement activity provides a foundation for implementation and evaluation.¹⁷ If children have a medical home that is nonjudgmental, supportive, and able to connect them to services, they have a better opportunity to flourish despite their exposure to adversity.

The results of the study also showed that children whose parents had excellent overall health and experienced less stress were more likely to flourish. Research shows that parental mental health has a significant impact on parenting, especially parents who also experienced childhood trauma.¹⁸ There are several evidence based interventions that focus on relationship-based approaches to improve parenting skills and help parents buffer the impact of trauma has on their

children.¹⁹ Early Head Start, child care, and child welfare programs could integrate these evidence-based programs into their current service delivery to improve parental mental health.¹⁹

Child flourishing is not only impacted by the environment set by their parents in the home but also by community factors outside the home such as neighborhood safety. An extensive body of literature suggests that there is a strong association between neighborhood safety and health outcomes.^{20–23} One study explored the relationship between social cohesion and perceived neighborhood safety; people who lived in supportive neighborhoods tend to perceive their neighborhood as being safer.²⁴ Interventions that focus on building a sense of cohesion among residents may be most beneficial in improving the perception of neighborhood safety, which could help to improve health and wellbeing.

A limitation in the present study related to the use of cross-sectional data is the inability to infer causality between the identified inhibitors/ promoters of child flourishing. For example, it is possible that families with a child who is flourishing are more likely to engage in a practice that has a patient centered medical home, or to view their current practice as a patient centered medical home. Future research involving a longitudinal study could provide opportunities to test causal mechanisms. Despite limitations, the NSCH captured rich information on both ACEs exposure and measures of community assets. The data also included several health indicators and indexes such as child flourishing. This information can help researchers identify factors that could serve to moderate the risk of ACE exposure, or enhance resilience.

In conclusion, ACEs exposure does not render health systems, parents and communities helpless. Even though child well-being decreases as the number of ACE exposures increase, there are things public health professionals and healthcare providers we can do. The data suggest practical and specific investments that health care systems and communities can take to enhance child well-being even in the context of cumulative ACE exposure. Implementing family intervention strategies, screening children early in the pediatric setting, connecting parents to mental health care, and enhancing social networking and supports in communities are strategies with promise to prevent long term adverse health outcomes among children exposed to adverse and traumatic events.

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