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Adverse Childhood Experiences and Mental Health Conditions Among Adolescents

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A B S T R A C T

Purpose: Adverse childhood experiences (ACEs) have been linked with poor physical and mental health. This study examined adult respondents' (e.g. parental) reports from the 2016–17 National Survey of Children's Health, a nationally representative study of health outcomes and social contexts of U.S. households with noninstitutionalized children.
Methods: Logistic regression was used to examine associations between ACEs and reports of current depression, anxiety, conduct/behavioral problems, attention-deficit/hyperactivity disorder, and substance use disorder among youth (n = 29,617; 49% female) aged 12–17 years.
Results: ACEs were associated with an increased likelihood of all current mental health diagnoses, particularly for youth exposed to four or more ACEs.
Conclusion: Although data relied on cross-sectional adult reports, results provide evidence of a graded association between ACEs exposure and adolescents' mental health conditions; associations with substance use disorder were particularly marked. Early childhood, multilevel, trauma-informed interventions are needed to prevent negative youth outcomes associated with ACEs.

IMPLICATIONS AND CONTRIBUTION

These results fill an important gap in the literature by linking adverse childhood experiences and current mental health diagnoses in a national sample of youth aged 12–17 years. Findings highlight the need for trauma-informed, home-, school- and community-based programs to address mental health outcomes in youth exposed to adverse childhood experiences.

Adverse childhood experiences (ACEs) have been reported to have profound, lasting effects on physical and mental health [1] and appear to be graded, such that exposure to a greater number of ACEs is associated with higher risk of adverse health outcomes [2]. National prevalence estimates have changed over time [1,3] and show evidence of secular increases in exposure to household substance abuse in 1992–1995 and 2007 [1] and parental divorce and financial hardship in 2011–2012 [3].

Findings from studies on the effects of ACEs have predominantly focused on adult mental health outcomes, including depression [4], anxiety [4], attention-deficit/hyperactivity disorder (ADHD) [5], substance abuse [4], and conduct problems [6]. However, the effects of ACEs measured earlier in adolescence are less understood. Some research findings suggest that ACEs show a graded effect on behavioral problems [6] during adolescence and other mental health outcomes in adulthood [2]. The purpose of this study was to examine associations between exposure to ACEs and mental health conditions among a nationally representative sample of adolescents in the U.S.

Method

Data were drawn from the 2016–17 National Survey of Children's Health, a nationally representative study of health outcomes and social contexts of U.S. households with noninstitutionalized children under the age of 18 years [7]. The

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Table 1
Descriptive information by ACE score

Characteristic	Overall sample (n = 29,617)	ACE score				
		0	1	2	3	4+
		(n = 14,136, 45.5%)	(n = 6,611, 26.5%)	(n = 3,187, 13.1%)	(n = 1,605, 6.4%)	(n = 1,931, 8.4%)
Child female sex, no. (%)	14,559 (49.2)	6,911 (49.0)	3,232 (49.5)	1,549 (47.0)	814 (47.7)	446 (47.87)
Child age, mean, years (SD)	14.7 (13.0–16.4)	14.7 (13.0–16.0)	14.7 (13.0–16.4)	14.8 (13.0–16.4)	14.8 (13.1–16.5)	14.9 (13.2–16.5)
Child race, no. (%)						
White	23,111 (78.0)	11,543 (73.2)	5,057 (64.4)	2,371 (56.1)	1,225 (66.0)	660 (58.5)
Black or African-American	1,949 (6.7)	547 (8.7)	524 (18.4)	328 (25.3)	142 (18.7)	102 (25.0)
American Indian or Alaska Native	223 (.8)	65 (.7)	33 (.4)	41 (2.6)	23 (.8)	13 (.5)
Asian	1,627 (5.5)	986 (6.5)	328 (4.1)	91 (2.6)	31 (2.4)	12 (.5)
Native Hawaiian, other Pacific Islander	109 (.4)	40 (.3)	19 (.3)	23 (1.2)	11 (.22)	5 (.2)
Other race	756 (2.6)	292 (5.4)	207 (7.4)	87 (6.6)	37 (5.37)	22 (4.6)
Two or more races	1,842 (6.2)	663 (5.1)	443 (5.1)	246 (5.8)	136 (6.5)	92 (10.7)
Child Hispanic ethnicity, no. (%)	3,096 (10.5)	1,221 (23.8)	764 (26.2)	391 (22.7)	198 (20.1)	122 (21.9)
Respondent relationship, no. (%)						
Biological, step, or adoptive parent	27,582 (94.9)	13,898 (97.2)	6,308 (93.6)	2,934 (91.2)	1,425 (88.8)	743 (80.2)
Grandparent	1,055 (3.6)	106 (1.3)	203 (4.2)	179 (7.4)	134 (7.1)	114 (12.3)
Foster parent	53 (.2)	4 (.1)	7 (.2)	2 (.1)	5 (.3)	7 (2.1)
Aunt or uncle	174 (.6)	25 (.2)	28 (1.3)	29 (.7)	18 (1.9)	15 (1.9)
Other	191 (.7)	41 (1.2)	38 (.7)	23 (.7)	16 (2.0)	18 (3.5)
Respondent female sex, no. (%)	19,365 (66.7)	8,599 (61.7)	4,476 (69.4)	2,336 (76.4)	1,264 (80.7)	714 (80.0)

ACE = adverse childhood experience; SD = standard deviation.

deidentified data set was weighted to represent the US population of noninstitutionalized children aged 0–17 years; all analyses were conducted using PROC SURVEY commands in SAS, version 9.4 (Cary, NC), to account for the complex survey design. The study was approved by the university's Office for Research Protections.

We examined associations between ACEs exposure and current mental health condition reports for youth aged 12–17 years (n = 29,617; 49% female). Adult respondents (96.7% parents) living in the household with youth indicated (yes/no) whether youth were exposed to household substance abuse problems, mental illness, domestic violence, neighborhood violence, parental divorce, parental death, parental incarceration, or race/ethnicity-based discrimination at any point in their lifetime, and economic hardship in the past year. To measure mental health diagnoses, respondents answered (yes/no) to whether a professional/clinician (e.g. doctor, health-care provider, or educator) ever indicated that the child has depression, anxiety, ADHD, substance use disorder (SUD), or behavioral/conduct problems. If respondents indicated yes, they were asked if the child currently had the condition.

Logistic regression analyses were conducted to determine the relationship between ACEs exposure and current mental health conditions. Variables were created to indicate exposure to none, one, two, three, and four or more ACEs, as an indicator of high ACE exposure associated with an increased likelihood of negative health outcomes [2].

Results

Approximately 46% of adolescents had no ACE exposure in 2016–2017 (Table 1). Parental divorce (33%), economic hardship (25%), household exposure to substance abuse problems (12%) or mental illness (10%), and parental incarceration (10%) emerged as the top five reported ACEs in 2016–2017. Witnessing domestic violence (7%), neighborhood violence (6%), parental death (6%), and race/ethnicity-based discrimination (6%) followed.

Results of the logistic regression analyses can be found in Table 2. Compared to youth without ACEs, youth with one ACE were more likely to report having current ADHD (adjusted odds ratio [aOR] 1.43; 95% confidence interval [CI], 1.15–1.80) and behavioral/conduct problems (aOR, 1.78; 95% CI, 1.24–2.56). There was approximately a twofold increase in the odds of having depression (aOR 2.38; 95% CI, 1.80–3.13) or anxiety (aOR, 2.00; 95% CI, 1.65–2.41) and a fivefold increase in the odds of having SUD (aOR, 5.29; 95% CI, 1.46–19.18) in youth with one ACE compared to youth without ACEs. The odds of having a current

Table 2
Adjusted odds ratio of current mental health conditions by ACE score compared to no ACEs

Outcome by ACE score	Odds ratio (95% CI)
One ACE	
Depression	2.38 (1.80–3.13)
Anxiety	2.00 (1.65–2.41)
Behavioral/conduct problems	1.78 (1.24–2.56)
ADHD	1.43 (1.15–1.80)
Substance use disorder	5.29 (1.46–19.18)
Two ACEs	
Depression	3.94 (2.95–5.26)
Anxiety	2.54 (2.03–3.16)
Behavioral/conduct problems	2.50 (1.69–3.71)
ADHD	1.91 (1.47–2.49)
Substance use disorder	3.96 (1.06–14.80)
Three ACEs	
Depression	6.50 (4.65–9.09)
Anxiety	4.75 (3.60–6.27)
Behavioral/conduct problems	3.57 (2.38–5.35)
ADHD	2.80 (2.04–3.78)
Substance use disorder	8.95 (2.39–33.53)
Four or more ACEs	
Depression	10.27 (7.81–13.50)
Anxiety	5.37 (4.27–6.76)
Behavioral/conduct problems	7.44 (5.00–11.06)
ADHD	4.14 (3.12–5.48)
Substance use disorder	15.71 (4.41–55.91)

ACE = adverse childhood experience; ADHD = attention-deficit/hyperactivity disorder; CI = confidence interval.

mental health diagnosis increased as exposure to ACEs increased. Compared to youth without ACEs, youth with four or more ACEs had the highest likelihood of a report of current depression (aOR, 10.27; 95% CI, 7.81–13.50), anxiety (aOR, 5.37; 95% CI, 4.27–6.76), behavioral/conduct problems (aOR, 7.44; 95% CI, 5.00–11.06), ADHD (aOR, 4.14; 95% CI, 3.12–5.48), and SUD (aOR, 15.71; 95% CI, 4.41–55.91).

Discussion

Findings provide evidence of a graded association between ACEs and adolescents' mental health conditions, such that the odds of having a current mental health condition increased with increasing levels of ACE exposure. Previous studies have documented the association between ACE exposure and mental health disorders in adulthood [1]; our study adds new information on this association in adolescence. It is imperative to understand whether this association continues into adulthood, given that adults with mental health disorders bear a higher burden of chronic disease [8] and mortality [9] than those without. These findings highlight the need to intervene early to prevent long-term risks.

A systematic review and meta-analysis examining multiple ACEs exposure and adult health found that the most potent effect of multiple ACEs exposure was on poor mental health, alcohol use, and sexual risk taking [2]. We corroborate the finding for poor mental health in adolescents; however, we are limited in our ability to infer causality given the cross-sectional nature of the data. In addition, we relied on adult reports of youth exposure to ACEs and mental health diagnoses, which is subject to bias, given the sensitivity of reporting ACEs and mental health conditions. In addition, adults' own mental health status may impact their reports, and conditions may be undiagnosed in youth with unmet health-care needs. The effects of specific ACEs were not addressed in this study, and it is likely that different ACEs have differential impacts on youth mental health outcomes. We also could not address the timing and chronicity of ACEs exposure in this study, which could provide important information on long-term risks.

Understanding the factors that confer protection against mental health problems in youth exposed to ACEs (e.g. neighborhood/school safety, parental monitoring, activities [3]) can inform the development of programs designed to aid mental health outcomes in children exposed to adversity. Early intervention to prevent outcomes associated with ACEs is crucial and must occur at multiple levels, including homes, schools, and communities with trauma-informed staff, who recognize symptoms, prevent retraumatization, and provide a safe supportive space for youth (e.g. asking “what *happened* to you?” vs. “what's *wrong* with you?”) [10]. Awareness of the associations between ACEs and internalizing (e.g. depression, anxiety) and externalizing disorders (e.g. behavioral/conduct problems, ADHD, SUD) is critical to early intervention.

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Ms. Bomysoad and Dr. Francis conceptualized this paper, conducted analyses, drafted the initial manuscript, and reviewed and revised the final manuscript. Both authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

References

[1] Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. Am J Prev Med 1998;14:245–58.

[2] Hughes K, Bellis MA, Hardcastle KA, et al. The effect of multiple adverse childhood experiences on health: A systematic review and meta-analysis. Lancet Public Health 2017;2:e356–66.

[3] Moore KA, Ramirez AN. Adverse childhood experience and adolescent well-being: Do protective factors matter? Child Indicators Res 2016;9:299–316.

[4] Mersky JP, Topitzes J, Reynolds AJ. Impacts of adverse childhood experiences on health, mental health, and substance use in early adulthood: A cohort study of an urban, minority sample in the US. Child Abuse Neglect 2013;37:917–25.

[5] Semiz ÜB, Öner Ö, Cengiz FF, Bilici M. Childhood abuse and neglect in adult attention-deficit/hyperactivity disorder. Psychiatry Clin Psychopharmacol 2017;27:344–8.

[6] Appleyard K, Egeland B, van Dulmen MH, Alan Sroufe L. When more is not better: The role of cumulative risk in child behavior outcomes. J Child Psychol Psychiatry 2005;46:235–45.

[7] Data Resoure Center for Child & Adolescent Health. National survey of Children's health (NSCH) survey methodology. Data Resource Center for child & adolescent health. Available at: http://childhealthdata.org/learn-about-the-nsch/methods. Accessed December 13, 2019.

[8] Patel V, Chatterji S. Integrating mental health in care for noncommunicable diseases: An imperative for person-centered care. Health Aff 2015;34:1498–505.

[9] Druss BG, Zhao L, Von Esenwein S, et al. Understanding excess mortality in persons with mental illness: 17-year follow up of a nationally representative US survey. Med Care 2011;49:599–604.

[10] Menschner C, Maul A. Issue Brief-Key Ingredients for Successful trauma-informed care Implementation. Trenton, NJ, USA: Center for Health Care Strategies, Inc, The Robert Wood Johnson Foundation; 2016.