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Racial/Ethnic Inequities in Adverse Childhood Experiences and Selected Health-Related Behaviors and Problems Among Maryland Adolescents

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Abstract

We examined racial/ethnic inequities in the prevalence of adverse childhood experiences (ACEs) and examined the association between ACEs and selected health-related behaviors and problems. Data for this cross-sectional study come from the 2018 Maryland Youth Risk Behavior Survey/Youth Tobacco Survey, a statewide survey of high school students (n = 40,188). ACEs included caregiver verbal abuse and household food insecurity, substance use or gambling, mental illness, and involvement with the criminal justice system. We estimated the prevalence of ACEs overall and by race/ethnicity, and then used multiple logistic regression to determine associations between ACEs and emotional/behavioral problems, adjusting for race/ethnicity. Outcome variables included emotional distress, poor school performance, suicidal ideation, fighting, alcohol use, and marijuana use. More than one fifth of students reported each individual ACE. Differences in the prevalence of ACEs by race/ethnicity were statistically significant ($p < .001$). More than one fourth (25.8%) reported one of the five ACEs, 15.1% reported two, and 15.4% reported three or more. For each ACE, reporting having experienced it (vs. not) was associated with a >30% higher prevalence for each of the outcome variables. Among students who reported three or more ACEs (relative to none), the odds of emotional distress and suicidal ideation were more than 8 times greater. Among Maryland adolescents, ACEs are common, are inequitably distributed by race/ethnicity, and are strongly linked to behavioral health. Findings suggest the need to monitor ACEs as a routine component of adolescent health surveillance and to refocus assessment and intervention toward “upstream” factors that shape adolescent health.

Keywords

ACEs; adverse childhood experiences; behavioral health; behavioral surveillance; child/adolescent health; emotional/behavioral problems; structural racism; substance use

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Emotional and behavioral problems among adolescents are increasingly viewed as a response to trauma from adverse childhood experiences, or “ACEs” (Centers for Disease Control and Prevention [CDC], 2019; Hughes et al., 2017; National Academies of Sciences, Engineering, and Medicine, 2019). Although state and national adolescent health surveillance programs routinely monitor health-related behaviors, they have not historically assessed ACEs. Therefore, we have a limited capacity for monitoring associations between ACEs and behavioral problems at the population level. Given their impact on adolescent behavior, items addressing five ACEs were included on the Maryland Youth Risk Behavior Survey/Youth Tobacco Survey (MD YRBS/YTS) for the first time in 2018 (Maryland Department of Health, 2019). MD YRBS/YTS is a statewide, school-based survey of public school students. The ACEs covered family problems with substance use/gambling and mental illness, incarceration of a family member, food insecurity, and caregiver verbal abuse. Including ACEs in the state’s adolescent health surveillance can provide key information to guide health promotion programs and services and to inform policy development.

We leverage the MD YRBS/YTS data to estimate the prevalence of ACEs among high school students in the state and assess associations between ACEs and selected health-related behaviors and problems. Because marginalization and structural racism shape the inequitable distribution of ACEs among youth (Bailey et al., 2017; D. R. Williams et al., 2019; D. R. Williams & Sternthal, 2010), we estimated racial/ethnic inequities in ACEs. The social and structural systems of oppression that influence ACEs are rarely explored in population-based studies of adolescents. Additionally, we assessed the association between ACEs and behavioral health indicators (i.e., poor school performance, emotional distress, suicidality, physical fighting, recent use of alcohol, and recent use of marijuana), adjusting for race/ethnicity.

METHOD

The 2018 MD YRBS/YTS data come from a school-based survey of public high school students in Maryland ($n = 41,091$). It is administered on a biennial basis by the Maryland Department of Education and Department of Health in conjunction with two CDC programs: the Youth Risk Behavior Surveillance System and the Youth Tobacco Survey. This study was deemed exempt from oversight by the Institutional Review Board at Johns Hopkins Bloomberg School of Public Health.

A multistage cluster sampling design was used to build the sample; schools were randomly selected with probability proportional to school enrollment size (Stage 1) and then classrooms were randomly sampled within schools (Stage 2). All students in sampled classes were invited to participate. The overall response rate (i.e., the product of response rates at the school and student levels) was >60%. Sample weights were developed by CDC to adjust for sampling design and student nonresponse. Weighted estimates are representative of youth attending public schools in the state.

MD YRBS/YTS is designed to monitor adolescent risk and health behaviors, including substance use, sexual behaviors, violence, and physical activity. The data collection instrument is available online (Maryland Department of Health, 2019), and items are drawn

from the standard instruments from CDC's Youth Risk Behavioral Surveillance System and Youth Tobacco Survey (Kann et al., 2018; Wang et al., 2019). The five binary items on ACEs were adapted from the ACEs module on the Behavioral Risk Factor Surveillance System instrument (O'Hara & Morelli, 2019). They include caregiver verbal abuse ("Does a parent or other adult in your home regularly swear at you, insult you, or put you down?"), food insecurity ("During the past 12 months, how often did the food your family bought not last and they did not have money to get more?"), problem substance use or gambling ("Have you ever lived with anyone who was an alcoholic or problem drinker, used illegal street drugs, took prescription drugs to get high, or was a problem gambler?"), mental illness ("Have you ever lived with anyone who was depressed, mentally ill, or suicidal?"), and criminal justice system involvement ("Has anyone in your household ever gone to jail or prison?"). For respondents with complete data on all five ACEs, we created an additional measure representing whether they reported 0, 1, 2, or 3 + of the specified ACEs. Outcome variables included emotional distress (i.e., feeling sad or blue over the past 2 weeks), poor school performance (i.e., grades are mostly Cs, Ds, or Fs), suicidal ideation (past 12 months), fighting at school (past 12 months), alcohol use (past 30 days), and marijuana use (past 30 days). Demographic variables included race/ethnicity, sex (male/female), and grade level (9th–12th). We used a single item to capture race and Hispanic ethnicity with five categories: Hispanic/Latinx, any race; non-Hispanic White, Black, and Asian (all monoracial); non-Hispanic bi- or multiracial; and "all other," which includes American Indian/Alaska Native and Native Hawaiian/Pacific Islander students.

We restricted the total sample to those with complete data on sex, grade level, and race/ethnicity ($n = 40,188$). Analyses based on number of ACEs were restricted to respondents with complete data on all five ACEs ($n = 35,915$). We used listwise deletion for all other analyses, and no models were missing more than 10% of the total number of respondents in the analytical sample. We used a Rao-Scott chi-square test to estimate differences in prevalence of ACEs by race/ethnicity. Next, we used multivariable logistic regression analyses to assess associations between each ACE and each emotional/behavioral problem, adjusting for race/ethnicity, sex, grade level, and sampling design. Analyses were conducted with the survey analysis procedures in SAS Version 9.4 (SAS Institute Inc., Cary, NC), which facilitates using sample weights and accounts for the complex sampling structure. We used the Huber-White robust standard errors clustered at the county level to account for nesting within counties.

RESULTS

As shown in Table 1, the sample was balanced on sex and grade level. The prevalence of ACEs was high: 29.2% reported family mental illness, 23.7% reported family problems with gambling or substance use, 23.5% had a family member who had been to prison/jail, 20.3% reported caregiver verbal abuse, and 16.9% reported food insecurity (Table 2). More than one half of the respondents reported at least one of the five ACEs. One quarter (25.8%) reported just one ACE, 15.1% reported two, and 15.4% reported three or more. Emotional and behavioral problems were also common. More than 10% reported fighting at school, more than 15% each reported marijuana use and suicidal ideation, more than 20% each

reported poor school performance and alcohol use, and more than 30% reported emotional distress.

Table 2 also shows that there were statistically significant ($p < .001$) differences in the prevalence of each ACE and in the number of ACEs by race/ethnicity. The prevalence of having at least one ACE was above 60% for students who were Black, Latinx, or multiracial. The most common ACE for Black students was having a family member who had been to prison or jail (33.3%), whereas for White students it was mental illness of a family member (33.7%). Students who were Black, Latinx, multiracial, or in the “other” category were more likely to report food insecurity and having had a family member in prison or jail than White and Asian students. On the other hand, students in the White, multiracial, and “other” race/ethnicity groups were more likely to report mental illness of family member than Black and Asian students. Asian students were less likely than those in all other groups to report problem gambling or substance use in their families.

For each ACE, those who reported they experienced it had at least a 30% higher prevalence of poor school performance, alcohol use, and marijuana use than those who did not, and had more than double the prevalence for emotional distress, suicidal ideation, and fighting (Table 3). The number of ACEs was associated with greater risk for all of the emotional and behavioral problems: A higher number of ACEs was associated with higher risk for problems. There was a noteworthy escalation in risk for both emotional distress and suicidal ideation based on whether students had one, two, or three or more ACEs. Compared to students reporting no ACEs, those who reported three or more were 8.07 times more likely to report emotional distress (95% confidence interval [7.12, 9.15]) and 8.67 times more likely to report suicidal ideation (confidence interval [7.69, 9.78]).

DISCUSSION

The state of Maryland included ACEs in their adolescent health surveillance program for the first time in 2018, presenting a new opportunity to examine adversity and behavioral health in a large, population-based sample. Our results show that ACEs are common, inequitably distributed by race and Hispanic ethnicity, and strongly linked to behavioral problems. These findings are consistent with the results from longitudinal studies of children and youth, as well as from retrospective studies with adults (Hughes et al., 2017).

We observed that Black, Latinx, and Multiracial students had particularly high prevalence estimates for ACEs, which may be a consequence of differential exposure to structural factors and social disadvantage. As just one example, our finding that one fourth reported that a family member had been to prison or jail is almost certainly tied to race-based inequities in the criminal justice system. We also demonstrated that youth who reported a family member had been in prison or jail (vs. not) were more than twice as likely to report poor school performance, emotional distress, suicidal ideation, fighting, and marijuana use. This result is aligned with studies linking parental incarceration to child health problems (Heard-Garris et al., 2019), and underscores the relevance of criminal justice policy to adolescent behavioral health.

Including ACEs in the MD YRBS/YTS is a feasible and cost-effective strategy for understanding their prevalence, and the repeated cross-sectional design of the surveillance program allows for ongoing monitoring. However, there are notable drawbacks. First, the MD YRBS/YTS assessed just five ACEs and not in much detail; a more comprehensive set of questions on adversity could provide a more nuanced story. Second, generalizability is limited because the sample includes only school-attending adolescents. The prevalence of ACEs and behavioral problems is likely to have been higher if youth who were no longer attending school were included. Additional systems for tracking ACEs will be needed to complement surveillance programs; those should use more detailed assessment tools and include adolescents who do not attend school.

Having information about ACEs from our state's adolescent health surveillance program demonstrates the need for trauma-informed services, which address emotional and behavioral problems by attending to adversity (CDC, 2019). In Maryland, MD YRBS/YTS data on ACEs are being used to advocate for a state law that would prioritize trauma-informed approaches to youth programs and services and require that professionals working with youth have training in providing trauma-informed services (Maryland General Assembly, 2021).

Importantly, increased monitoring of ACEs opens the door to investigate the structural, social, and environmental factors that shape adolescent health. Substantial and compelling research suggests that addressing structural racism and social disadvantage is crucial to improving health and health equity across the lifespan (Bailey et al., 2017; D. R. Williams et al., 2019). Therefore, our next steps in this area of research are to determine how area-level deprivation and structural racism are associated with risk for ACEs. In the long term, we envision exploring whether specific policy initiatives, such as criminal justice reform or increasing access to behavioral health services, lead to declines in ACEs and improvements in adolescent behavioral health.

Historically, adolescent health surveillance programs have focused on health and risk behaviors, which deemphasizes the role of environmental and social factors that shape risk for behavioral health. There is a trend toward including ACEs in surveillance, as evidenced by their presence in the Youth Risk Behavior Surveys in Maryland, Nevada, and Vermont (Maryland Department of Health, 2019; Vermont Department of Health, 2019; L. Williams, et al., 2020). By inquiring about ACEs in surveillance programs, we can generate the knowledge needed to (1) support trauma-sensitive programs and (2) move the target of our interventions upstream, from behavioral problems to their social and structural determinants. The long-term product of this work will be a culture change in health promotion practice marked by a proliferation of trauma-sensitive programs and primary prevention of ACEs through structural interventions.

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Table 1
Description of Sample by Sex, Race/Ethnicity, and Grade Level, Maryland High School Students, 2018

Characteristic	Total sample	Race/ethnicity, % [95% confidence interval]					
		White	Black	Latinx	Asian	Multiracial	All other
Total (n)	40,188	21,326	7,843	4,847	1,661	2,765	1,746
Sex							
Male (n = 19,764)	50.9 [49.5, 52.4]	50.8 [49.2, 52.2]	50.2 [47.9, 52.4]	51.0 [47.1, 54.9]	53.4 [49.3, 57.6]	45.2 [42.4, 48.1]	60.4 [56.0, 64.9]
Female (n = 20,424)	49.1 [47.6, 50.5]	49.2 [47.8, 50.7]	49.8 [47.6, 52.1]	49.0 [45.1, 52.9]	46.6 [42.4, 50.7]	54.8 [51.9, 57.6]	39.6 [35.1, 44.0]
Grade level							
9th (n = 11,631)	27.5 [24.7, 30.4]	26.9 [24.3, 29.5]	25.7 [22.1, 29.4]	33.2 [26.9, 39.4]	21.7 [16.8, 26.6]	29.3 [24.8, 33.8]	33.5 [28.6, 38.4]
10th (n = 11,119)	26.1 [23.5, 28.7]	26.1 [23.3, 29.1]	26.6 [22.8, 30.3]	27.2 [22.0, 32.3]	21.5 [15.7, 27.3]	28.9 [24.9, 32.9]	22.0 [17.8, 26.2]
11th (n = 9,762)	23.3 [21.2, 25.4]	22.9 [20.8, 25.1]	24.1 [20.7, 27.4]	20.8 [17.9, 23.8]	28.2 [21.4, 34.9]	20.1 [17.2, 23.0]	25.9 [21.9, 29.8]
12th (n = 7,676)	23.0 [21.0, 25.1]	24.0 [21.4, 26.5]	23.6 [20.9, 26.3]	18.9 [16.1, 21.6]	28.6 [19.0, 38.2]	21.7 [18.1, 25.3]	18.6 [14.7, 22.5]

Note. Percentages are weighted, frequencies are unweighted.

Prevalence [95% Confidence Interval] of ACEs and Emotional and Behavioral Problems by Race/Ethnicity, Maryland High School Students, 2018

Table 2

ACEs and emotional and behavioral problems	Total (n = 40,188)	White (n = 21,326)	Black (n = 7,843)	Latinx (n = 4,847)	Asian (n = 1,661)	Multiracial (n = 2,765)	All other (n = 1,746)
Individual ACEs							
Food insecurity	16.9 [15.9, 18.0]	10.1 [9.2, 10.9]	24.7 [22.7, 26.8]	22.3 [19.7, 24.8]	6.8 [4.8, 8.7]	19.1 [16.4, 21.9]	23.5 [19.9, 27.0]
Family gambling or substance use	23.7 [22.8, 24.6]	24.1 [23.2, 25.1]	22.8 [21.3, 24.4]	27.1 [24.7, 29.5]	14.3 [10.8, 17.8]	28.7 [25.6, 31.7]	22.7 [19.1, 26.4]
Mental illness of a family member	29.2 [28.3, 30.0]	33.7 [32.6, 34.9]	24.1 [22.7, 25.6]	28.0 [25.0, 30.9]	19.6 [16.6, 22.5]	39.5 [36.3, 42.8]	30.6 [26.2, 35.0]
Family member has been in prison/jail	23.5 [22.4, 24.5]	17.2 [16.2, 18.1]	33.3 [31.2, 35.4]	24.5 [21.8, 27.2]	7.4 [4.7, 10.1]	30.6 [27.4, 33.7]	28.8 [24.3, 33.4]
Caregiver verbal abuse	20.3 [19.5, 21.1]	19.0 [18.0, 20.0]	21.7 [19.7, 23.6]	20.9 [19.2, 22.6]	16.8 [13.9, 19.7]	26.6 [23.7, 29.5]	21.0 [17.4, 24.6]
No. of ACEs							
None	43.7 [42.6, 44.9]	47.4 [46.2, 48.7]	37.5 [35.4, 39.6]	39.7 [37.3, 42.1]	62.5 [58.0, 67.0]	34.3 [30.7, 37.8]	44.4 [39.6, 49.1]
One	25.8 [24.9, 26.6]	25.0 [23.9, 26.0]	28.3 [26.7, 30.0]	25.9 [23.7, 28.0]	21.0 [18.2, 23.7]	25.4 [22.4, 28.4]	22.7 [18.6, 26.8]
Two	15.1 [14.4, 15.7]	12.9 [12.3, 13.5]	17.9 [16.4, 19.4]	17.3 [15.7, 18.8]	9.8 [7.4, 12.1]	17.5 [15.1, 19.9]	14.6 [11.0, 18.2]
Three or more	15.4 [14.7, 16.2]	14.7 [13.9, 15.5]	16.3 [14.5, 18.1]	17.1 [15.0, 19.2]	6.8 [4.6, 9.0]	22.8 [19.9, 25.7]	18.3 [14.7, 21.9]
Emotional and behavioral problems							
Poor school performance	21.1 [20.0, 22.2]	15.2 [14.0, 16.4]	27.1 [25.5, 28.7]	29.1 [26.5, 31.6]	9.4 [7.1, 11.7]	20.6 [17.3, 23.8]	27.1 [23.1, 31.0]
Emotional distress (past 2 weeks)	31.8 [30.7, 32.9]	30.6 [29.2, 32.0]	30.9 [29.1, 32.7]	36.6 [33.5, 39.8]	26.3 [23.1, 29.4]	39.4 [36.5, 42.3]	33.0 [28.9, 37.0]
Suicidal ideation (past 12 months)	17.7 [17.1, 18.4]	17.6 [16.7, 18.5]	17.7 [16.5, 19.0]	16.7 [15.0, 18.5]	15.3 [12.6, 18.0]	25.8 [23.5, 28.1]	18.8 [15.2, 22.3]
Physical fighting at school (past 12 months)	11.5 [10.7, 12.2]	7.2 [06.5, 08.0]	16.6 [15.2, 18.0]	12.2 [10.6, 13.8]	4.3 [3.1, 5.6]	13.1 [11.0, 15.2]	17.0 [14.3, 19.6]
Alcohol use (past 30 days)	23.8 [22.6, 24.9]	32.2 [30.6, 33.9]	16.5 [15.1, 18.0]	19.4 [16.8, 22.1]	13.4 [10.7, 16.1]	28.0 [24.3, 31.7]	24.3 [20.7, 27.9]
Marijuana use (past 30 days)	17.3 [16.4, 18.2]	18.6 [17.3, 19.9]	17.8 [16.3, 19.4]	16.1 [14.1, 18.1]	7.1 [05.0, 09.2]	21.2 [18.4, 24.0]	17.3 [14.5, 20.2]

Note. ACE = adverse childhood experience.

Table 3
Prevalence Ratios [95% Confidence Intervals] for ACEs and Emotional and Behavioral Problems, Maryland High School Students (2018)

ACEs and emotional and behavioral problems	Poor school performance	Emotional distress	Suicidal ideation	Fighting at school	Alcohol use	Marijuana use
Individual ACEs						
Food insecurity	1.72 [1.51, 1.98]	2.32 [2.09, 2.57]	2.20 [1.92, 2.53]	2.14 [1.84, 2.49]	1.45 [1.30, 1.63]	1.61 [1.42, 1.84]
Family gambling/substance use	1.38 [1.22, 1.56]	2.64 [2.42, 2.88]	2.70 [2.48, 2.94]	2.02 [1.77, 2.29]	1.75 [1.60, 1.92]	2.23 [1.99, 2.50]
Mental illness of a family member	1.45 [1.21, 1.50]	3.81 [3.52, 4.12]	3.88 [3.54, 4.26]	2.03 [1.79, 2.30]	1.59 [1.47, 1.72]	1.99 [1.78, 2.22]
Family member has been in prison/jail	2.04 [1.81, 2.29]	2.04 [1.85, 2.25]	2.06 [1.88, 2.26]	2.59 [2.26, 2.97]	1.75 [1.59, 1.93]	2.69 [2.39, 3.03]
Caregiver verbal abuse	1.32 [1.16, 1.51]	4.02 [3.64, 4.43]	4.21 [3.81, 4.64]	2.27 [1.99, 2.58]	1.86 [1.67, 2.08]	1.95 [1.74, 2.20]
No. of ACEs						
One	1.44 [1.28, 1.61]	2.61 [2.38, 2.87]	2.65 [2.31, 3.04]	2.05 [1.76, 2.39]	1.39 [1.23, 1.56]	1.50 [1.26, 1.78]
Two	1.68 [1.41, 2.01]	4.54 [4.04, 5.11]	4.88 [4.16, 5.73]	2.58 [2.10, 3.17]	1.81 [1.58, 2.07]	2.39 [2.04, 2.80]
Three or more	2.24 [1.89, 2.64]	8.07 [7.12, 9.15]	8.67 [7.69, 9.78]	4.73 [4.03, 5.56]	2.59 [2.32, 2.90]	3.99 [3.47, 4.58]

Note. Estimates are from multivariable logistic regression, all models adjusted for sex, race/ethnicity, and grade level. ACE = adverse childhood experience.