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Adverse Childhood Experiences and Sexually Transmitted Diseases in Men and Women: A Retrospective Study

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ABSTRACT. *Objective.* Adverse childhood experiences (ACEs) may have long-term consequences on at-risk behaviors that lead to an increased risk of sexually transmitted diseases (STDs) during adulthood. Therefore, we examined the relationship between ACEs and subsequent STDs for both men and women.

Methods. A total of 9323 (4263 men and 5060 women) adults ≥ 18 years of age participated in a retrospective cohort study evaluating the association between ACEs and self-reported STDs. Participants were adult members of a managed care organization who underwent routine medical evaluations and completed standardized questionnaires about 7 categories of ACEs, including emotional, physical, or sexual abuse; living with a battered mother; and living with a substance-abusing, mentally ill, or criminal household member. Logistic regression was used to model the association between the cumulative categories of ACEs (range: 0–7) and a history of STDs.

Results. We found that 59% (2986) of women and 57% (2464) of men reported 1 or more categories of adverse experiences during childhood. Among those with 0, 1, 2, 3, 4 to 5, and 6 to 7 ACEs, the proportion with STDs was 4.1%, 6.9%, 8.0%, 11.6%, 13.5%, and 20.7% for women and 7.3%, 10.9%, 12.9%, 17.1%, 17.1%, and 39.1% for men. After adjustment for age and race, all odds ratios for reporting an STD had confidence intervals that excluded 1. Among those with 1, 2, 3, 4 to 5, and 6 to 7 ACEs, the odds ratios were 1.45, 1.54, 2.22, 2.48, and 3.40 for women and 1.46, 1.67, 2.16, 2.07, and 5.3 for men.

Conclusions. We observed a strong graded relationship between ACEs and a self-reported history of STDs among adults. *Pediatrics* 2000;106(1). URL: <http://www.pediatrics.org/cgi/content/full/106/1/e11>; *sexually transmitted diseases, child abuse, domestic violence, alcoholism, children of impaired parents, drug abuse.*

ABBREVIATIONS. STD, sexually transmitted disease; ACE, adverse childhood experience; CTS, Conflict Tactics Scale; OR, odds ratio; CI, confidence interval.

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Reported rates of sexually transmitted diseases (STDs) in the United States surpass those of every other developed country in the world.^{1,2} In the United States each year, >12 million individuals, 3 million of whom are adolescent, are infected with an STD.³ Furthermore, STDs account for 87% of the top 10 most frequently reported diseases in the country.⁴ The associated health and economic consequences of the current epidemic of STDs are staggering. Complications of STDs include cancer, infertility, potentially fatal ectopic pregnancy, chronic pelvic pain, spontaneous abortion, stillbirth, premature delivery, low birth weight, neurologic sequelae, and death.^{5–9} The costs associated with STDs and these complications exceed \$10 billion per year.⁹

Adverse childhood experiences (ACEs), including varying forms of child abuse and household dysfunction, may have long-term consequences on adult sexual behaviors that increase the risk of STDs. For several decades, it has been clear that childhood sexual abuse in the United States occurs in epidemic proportions in girls, but only recently has it become evident that the same is true for boys.^{10,11} Such abuse rarely takes place as an isolated event but typically occurs within a broader social context of multiple adversities, including familial dysfunction, deprivation, and destructiveness.^{11,13} Other forms of childhood adversity that commonly accompany childhood sexual abuse include physical abuse or emotional abuse; witnessing intimate partner violence; living with adult family members who are substance abusers, mentally ill, or suicidal; or living with a family member who has been imprisoned. Recent evidence suggests that such ACEs are endemic: half of an adult managed care population reported that these experiences occurred during their childhood.¹¹ Disturbingly, as the number of ACEs increases, the prevalence of behaviors and diseases associated with major causes of morbidity and mortality also increases.^{11,14}

Because the prevalences of both ACEs and STDs are excessive, any association between the 2 would have serious public health implications. Therefore, we examined the association between reported STDs in a managed care population and ACEs, including emotional, physical, or sexual abuse; living with a battered mother; and living with household members who were substance abusers, mentally ill or suicidal, or criminals. Because of possible variations between men and women in the absolute and rela-

tive magnitudes of these associations, we report our findings separately for these 2 groups.

METHODS

The methods for this retrospective cohort study have been previously described in detail.¹¹ The ACEs study was designed to evaluate the association between adverse experiences during childhood and adult diseases and health behaviors associated with the leading causes of morbidity and mortality in the United States. The study was conducted among adult Kaiser Permanente members in San Diego, California. Among plan members 25 years of age and older who were continuously enrolled from 1992 to 1995, >80% underwent a standardized biopsychosocial and medical examination at a primary care clinic. Annually, nearly 50 000 members undergo such an examination.

All 13 494 Kaiser Health Plan members who completed standardized medical evaluations at the primary care clinic from August to November of 1995 or January to March of 1996 were eligible to participate in the ACE Study. One week after the clinic visit, these members received a mailed questionnaire that addressed health behaviors and ACEs. This questionnaire was administered in English alone, included 60 questions, and took ~45 minutes to complete. The questionnaire was prepared at a high school reading level, because all participants had completed at least some high school. These study instruments, which were carefully developed by a multidisciplinary study team, adapted many questions from previously used survey instruments, including the Conflict Tactics Scale and questions from Wyatt.^{15,16} A total of 70.5% (9508) of potential participants returned the questionnaires. Nonrespondents were no different from respondents with respect to gender, education, or history of childhood sexual abuse. Compared with nonrespondents, respondents tended to be slightly older (56.7 years vs 49.3 years) and were more likely to be white (84% vs 75%). For the purposes of the present analysis, which evaluates the association between ACEs and STDs, we included all male and female respondents who had complete information on race and education (9323/9508).

The ACE Study was approved by the institutional review boards of the Southern California Permanente Medical Group, Emory University, and the Office of Protection from Research Risks, National Institutes of Health.

Definitions of ACEs and STDs

All questions about ACEs pertained to the respondents' experience during the first 18 years of life. Each category of abuse and household dysfunction (emotional, physical, or sexual abuse; reporting that mother was treated violently; living with household members who were substance abusers; living with household members who were mentally ill or suicidal; or living with household members who were ever imprisoned) has been described in detail.¹¹ For questions from the Conflict Tactics Scale (CTS),¹⁵ the response categories were: never, once or twice, sometimes, often, or very often.

Verbal Abuse

Verbal abuse was determined from answers to the following 2 questions from the CTS:¹⁵ 1) How often did a parent, stepparent, or adult living in your home swear at you, insult you, or put you down? and 2) How often did a parent, stepparent, or adult living in your home threaten to hit you or throw something at you, but didn't do it? Responses of often or very often to either item defined verbal abuse during childhood.

Physical Abuse

Two questions from the CTS were used to describe physical abuse during childhood.¹⁵ These questions were "Sometimes parents or other adults hurt children. While you were growing up, that is, in your first 18 years of life, how often did a parent, stepparent, or adult living in your home: 1) push, grab, slap, or throw something at you? or 2) hit you so hard that you had marks or were injured?" Respondents were defined as experiencing physical abuse if they answered often or very often to the first question or sometimes, often, or very often to the second one.

Sexual Abuse

Four questions from Wyatt¹⁶ were adapted to define contact sexual abuse during childhood: "Some people, while they are growing up in their first 18 years of life, had a sexual experience with an adult or someone at least 5 years older than themselves. These experiences may have involved a relative, family friend, or stranger. During the first 18 years of life, did an adult, relative, family friend, or stranger ever: 1) touch or fondle your body in a sexual way, 2) have you touch their body in a sexual way, 3) attempt to have any type of sexual intercourse with you (oral, anal, or vaginal), or 4) actually have any type of sexual intercourse with you (oral, anal, or vaginal)." A yes to any of these 4 questions defined a participant as having experienced sexual abuse during childhood.

Battered Mother

Four questions were used from the CTS¹⁵ to define childhood exposure to a battered mother. The questions were as follows: "Sometimes physical blows occur between parents. While you were growing up in your first 18 years of life, how often did your father (or stepfather) or mother's boyfriend do any of these things to your mother (or stepmother): 1) push, grab, slap, or throw something at her; 2) kick, bite, hit her with a fist, or hit her with something hard; 3) repeatedly hit her over at least a few minutes; or 4) threaten her with a knife or gun or use a knife or gun to hurt her." A response of sometimes, often, or very often to at least 1 of the first 2 questions or any response other than never to at least 1 of the third and fourth questions defined a respondent as having had a battered mother.

Household Substance Abuse

Two questions adapted from the National Health Interview Survey¹⁷ addressed whether the respondent, during her or his childhood, lived with an alcoholic or problem drinker or with anyone who used street drugs. An affirmative response to either question indicated childhood exposure to substance abuse in the household.

Mental Illness in Household

A respondent who reported that during his or her childhood, anyone was mentally ill or depressed or that anyone in the household had attempted suicide was considered to have been exposed to mental illness in the household.

Incarcerated Household Member

If anyone in the household had gone to prison during the respondent's childhood, this was defined as having childhood exposure to an incarcerated household member.

STD

Information about STDs was obtained as part of the standard medical history in the adult health clinic. Plan members who answered yes to the following question were classified as having an STD: "Have you ever been treated for or told you had any venereal disease?"

Statistical Analyses

Persons with incomplete information about an ACE were considered not to have had that experience. Analyses using this approach were essentially identical to those that excluded persons with incomplete information. The association between each ACE and a self-reported history of STDs, for both men and women, was estimated, using logistic regression models to obtain adjusted odds ratios (ORs) and 95% confidence intervals (CIs). Findings were considered to be statistically significant if they did not include the null value of 1. Subsequently, the Mantel-Haenszel χ^2 test for linear trend in proportions was used to evaluate whether the prevalence of STDs increased as the number of categories of ACEs (classified as 0, 1, 2, 3, 4 to 5, or 6 to 7) increased.¹⁸ Covariates in all models included age and race (other vs white).

Finally, we assessed whether the relationship between the ACEs and STDs was mediated by behavioral variables that we expected to function as intervening variables, such as early initiation of sexual activity (younger than 15 years of age), self-reported problems with substance abuse (including street drugs

or alcohol) as an adult, or high number of lifetime sex partners (>30). We chose 30 as the cutoff for number of lifetime sexual partners because preliminary analyses showed ACEs to be associated with this variable in a dose-response fashion. If in fact these high-risk behaviors that have been associated with both ACEs¹¹ and STDs form part of the causal pathway between ACEs and STDs, one would expect that the association between ACEs and STDs would be substantially reduced and perhaps even eliminated in models that control for these variables.¹⁹

RESULTS

For the purposes of this analysis, we included survey data from a total of 4263 men and 5060 women. Among male participants, the majority were 35 years of age and older at the time of interview, had some college education, were currently married (81%), and were either employed full-time (51%) or retired (42%); ~80% were white (Table 1). Characteristics were generally similar for female participants, except that they were less likely to be currently married (67%) or employed full-time (41%).

Fifty-nine percent (2986) of women and 57% (2464) of men reported ≥ 1 adverse experience during childhood. A total of 7.2% (362/5032) of women and 10.5% (458/4347) of men reported a history of STD. We found that the absolute risk of STD was higher for men than for women for every subgroup considered (Table 2). For women, each category of ACE was significantly and independently associated with an increased risk of reporting an STD. Compared with women who denied having experienced the specific category of either abuse or household dysfunction, we observed the following increases in STD after adjustment for race and age at interview: 100% for those who, as children, had incarcerated family members, 90% for those who experienced childhood sexual abuse, 70% for those reporting childhood

emotional abuse, 60% for those reporting physical abuse, 50% for those reporting household substance abuse, 50% for those who lived with a mentally ill family member during childhood, and 40% for those who lived with a battered mother. For men, the increased risk of STD for those experiencing childhood abuse of household dysfunction was 160% for those with an incarcerated family member, 90% for those who had been sexually abused, 50% for those who lived with a battered mother, 50% for those who lived with a substance abuser, 40% for those who had been physically abused, 40% for those who had been emotionally abused, and 20% for those who had a mentally ill family member. Each of these categories was statistically significant for both men and women before adjustment using a logistic model (data not shown), and all except the latter (men having a mentally ill household member) remained significant after adjustment. Because the adjusted and unadjusted estimates were quite similar for those living with a mentally ill household member, it is likely that the loss of significance after adjustment is explained by the loss of precision attributable to small samples in some cells.

Furthermore, for both women and men, we found that the prevalence of reporting an STD increased as the number of categories of exposure to adverse experiences during childhood increased (Table 3). For men, the prevalence of STDs ranged from 7.3% for those reporting no categories of ACE, to 39.1% for those reporting 6 to 7 categories of ACEs. For women, the prevalence of ACEs ranged from 4.1% for those reporting no categories of ACEs to 20.7% for those reporting 6 to 7 categories of ACEs. Unadjusted ORs for experiencing STDs were 1.0, 1.72, 2.02, 3.06, 3.62, and 6.08 for women with 0, 1, 2, 3, 4 to 5, and 6 to 7 ACEs (*P* for trend <.000001) and 1.0, 1.54, 1.88, 2.59, 2.61, and 8.11 for men with 0, 1, 2, 3, 4 to 5, and 6 to 7 ACEs (*P* for trend <.000001). When we stratified this analysis by race, we observed the same pattern of increasing STDs with increases in ACEs, for both white and minority races (data not shown).

After adjustment for age at interview and race, we observed statistically increased ORs for STDs with increasing numbers of ACEs for women (Table 4). Among women, the ORs for reporting STDs were 1.0, 1.5, 1.5, 2.2, 2.5, and 3.4 among those with 0, 1, 2, 3, 4 to 5, and 6 to 7 ACEs. A similar pattern was observed in men, with all adjusted ORs ranging from 1.0 to 5.3. Results were unchanged in models that also adjusted for educational status.

If ACEs influence risk behaviors in ways that are causally associated with STDs, adjusting for these behaviors should reduce or eliminate the association.¹⁶ Thus, models that include these variables will provide insights into their role in the causal pathway. For both women and men, when we added intervening behavioral variables to the logistic model (including early initiation of sexual intercourse [before 15 years of age], >30 lifetime sex partners, and problems with substance abuse [alcohol or drugs, entered as 2 separate variables]), all ORs were substantially reduced and most were no longer statistically significant.

TABLE 1. Characteristics of Study Population: Kaiser Permanente, 1995–1996

	Females (<i>n</i> = 5060) % (<i>n</i>)	Males (<i>n</i> = 4363) % (<i>n</i>)
Age at interview		
19–34	11.6 (589)	6.9 (300)
35–49	26.2 (1324)	24.1 (1050)
50–64	30.8 (1559)	32.5 (1418)
65+	31.4 (1588)	36.5 (1595)
Race/ethnicity		
White	77.2 (3905)	80.9 (3531)
Black	4.9 (249)	4.8 (208)
Hispanic	6.4 (326)	4.8 (208)
Asian	7.5 (377)	5.9 (258)
American Indian	.4 (20)	.6 (25)
Other	3.6 (183)	3.0 (132)
Education		
Some high school	7.6 (383)	5.9 (258)
High school graduate	23.2 (1174)	16.2 (707)
Some college	32.6 (1651)	29.6 (1293)
College graduate	36.6 (1852)	48.3 (2105)
Employment*		
Full-time	40.5 (1911)	50.1 (2107)
Part-time	11.9 (560)	4.4 (186)
Retired/unemployed	47.6 (2247)	45.5 (1916)
Currently married*†		
Yes	67.0 (3384)	81.4 (3546)
No	33.0 (1666)	18.6 (810)

* Sample incomplete attributable to missing data.

† Includes living as married.

TABLE 2. Association Between Categories of ACEs and STDs for Men and Women: Kaiser Permanente, 1995–1996

	Women			Men		
	Total N	Percentage With STD	Adjusted OR† (95% CI)	Total N	Percentage With STD	Adjusted OR† (95% CI)
Physical abuse*						
Yes	1441	10.5 (151)	1.6	1377	13.6 (187)	1.4
No	3591	5.9 (211)	(1.2–2.0)	2970	9.1 (271)	(1.2–1.8)
Emotional abuse*						
Yes	701	12.6 (88)	1.7	315	15.9 (50)	1.4
No	4331	6.3 (274)	(1.3–2.2)	4032	10.1 (408)	(1.0–2.0)
Sexual abuse*						
Yes	1233	11.8 (145)	1.9	643	16.6 (107)	1.9
No	3799	5.7 (217)	(1.5–2.4)	3704	9.5 (351)	(1.5–2.4)
Battered mother*						
Yes	670	10.8 (72)	1.4	472	15.9 (75)	1.5
No	4362	6.7 (290)	(1.1–1.9)	3875	9.9 (383)	(1.1–2.0)
Household substance abuse*						
Yes	1397	11.1 (155)	1.5	951	14.3 (136)	1.3
No	3635	5.7 (207)	(1.2–1.9)	3396	9.5 (322)	(1.1–1.7)
Mental illness in household*						
Yes	1052	10.7 (113)	1.5	649	13.3 (86)	1.2
No	3980	6.3 (249)	(1.2–1.9)	3698	10.1 (372)	(.94–1.6)
Incarcerated family member*						
Yes	175	19.4 (34)	2.0	141	27.0 (38)	2.6
No	4799	6.8 (327)	(1.3–2.9)	4139	10.0 (413)	(1.8–3.9)

* Total *n* decreased attributable to missing data.

† Adjusted for age and race.

TABLE 3. Prevalence of STDs by Number of Categories of ACEs: Kaiser Permanente, 1995–1996

	Women			Men		
	Total N	Percentage (<i>n</i>) With STD	Unadjusted OR	Total N	Percentage (<i>n</i>) With STD	Unadjusted OR
0	2067	4.1 (85)	1.0	1893	7.3 (139)	1.0
1	1196	6.9 (82)	1.7	1261	10.9 (137)	1.5
2	729	8.0 (58)	2.0	649	12.9 (84)	1.9
3	492	11.6 (57)	3.1	299	17.1 (51)	2.6
4–5	461	13.5 (62)	3.6	222	17.1 (38)	2.6
6–7	87	20.7 (18)	6.1	23	39.1 (9)	8.1
<i>P</i> for trend		<.000001			<.000001	

TABLE 4. Association Between Number of Categories of ACEs and Likelihood of STDs

	Women		Men	
	Adjusted OR (95% CI)*	OR Adjusted for Intervening Variables (95% CI)†	Adjusted OR (95% CI)*	OR Adjusted for Intervening Variables (95% CI)†
0	1.00	1.00	1.00	1.00
1	1.5 (1.1–2.0)	1.3 (.89–1.8)	1.5 (1.1–1.9)	1.2 (.86–1.5)
2	1.5 (1.1–2.2)	1.1 (.74–1.7)	1.7 (1.2–2.2)	1.2 (.87–1.7)
3	2.2 (1.5–3.2)	1.6 (1.0–2.4)	2.2 (1.5–3.1)	1.4 (.92–2.1)
4–5	2.5 (1.7–3.5)	1.6 (1.1–2.4)	2.1 (1.4–3.1)	1.2 (.77–2.0)
6–7	3.4 (1.19–6.1)	1.6 (.78–3.3)	5.3 (2.2–12.7)	2.1 (.72–6.1)

* Adjusted for age and race.

† Adjusted for age, race, 30 or more lifetime sex partners, initiation of intercourse before 15 years of age, use of street drugs, and problems with alcohol.

DISCUSSION

More than half of the men and women in this study population had experienced 1 or more categories of adverse experiences during childhood. For both women and men, each category of abuse (emotional, physical, and sexual) and of household dysfunction (battered mother, living with substance abusing, mentally ill, or criminal household member) was associated with an increased risk of STD.

Among women, the prevalence of STDs increased in a stepwise fashion as the number of categories of exposure to ACEs increased. A similar pattern was observed for men. For both women and men, the prevalence of STDs was 5 times higher for those who had been exposed to 6 to 7 categories of ACEs during childhood than for those who were exposed to no categories of ACEs during childhood.

To date, a large number of studies have focused on

biologic, behavioral, and social risk factors that can be considered proximate determinants of STDs, because they tend to be present during the relatively short period that precedes the acquisition of an STD.^{9,20–24} Examples of such biologic risk factors include cervical ectopy in women, vaginal douching, and use of hormonal contraception.^{9,20–22} Behaviors that have been shown to increase the risk of STDs include having a greater number of sex partners, initiation of sexual activity at a young age (presumably a surrogate for large numbers of partners and less consistent use of condoms), lack of use of barrier contraception, increased frequency of intercourse, and having high-risk sex partners.^{9,23} As with biologic risk factors, the lag time between the onset of behavioral risk factors and the acquisition of STDs is believed to be relatively short. Even social risk factors, such as poverty, lack of access to health care, and substance abuse,^{24–27} are typically present during the period just before transmission of an STD.

In our study, by addressing the role of ACEs in the development of STDs, we addressed exposures that tend to have occurred early in life, long before the STD developed. To date, the concepts of initiators and promoters as being the component causes of disease that act early and late, respectively, have not been used to describe the epidemiology of STDs. Rather, these concepts have typically been applied to chronic disease processes such as carcinogenesis.²⁸ However, our results, along with evidence from the childhood psychiatric literature,^{29,30} suggest that ACEs acting early in life may function as initiators of STDs, which lead to risk behaviors that subsequently act as promoters.

We considered limitations that may have biased our findings. Because exposure to ACEs and past treatment of STDs were measured by self-report, it is likely that both the childhood exposures and the STD outcomes were underreported. Specifically, it is possible, although not highly likely given the educational level of the sample, that some younger respondents would have been unfamiliar with the term venereal diseases and, consequently, would have underreported the occurrence of STDs. Any such underreporting would likely have led to underestimates of the strength of association between ACEs and STDs. Thus, the true association between ACEs and STDs is probably stronger than that reported. Similarly, classifying persons with incomplete information about an ACE as having not had that experience would lead to a conservative estimate of the relationship between ACEs and STDs. In theory, our study may have been strengthened by the ability to control for additional behavioral risk factors, such as consistent condom use before STD diagnosis. However, we suspect, given our results of analyses that adjusted for other important behavioral risk factors, that inconsistent condom use may have functioned as an unmeasured intervening variable in the causal pathway. Finally, because information regarding when the STDs occurred was not available, we are unable to evaluate the number of participants who may have experienced an STD during adolescence, which overlaps with the last portion of the reported

period during which ACEs occurred. However, because the focus of most questions regarding ACEs was on events occurring during childhood, it is probable that the majority of cases of reported STDs did in fact follow, rather than precede, the onset of exposure to various categories of ACEs. In fact, it is counterintuitive and not plausible for the majority of our participants that they first experienced an STD in adolescence and this STD caused their families to suddenly become adversity-laden. Future studies would be strengthened by measuring both the dates of occurrence and the types of previous STDs.

Until now, national STD prevention efforts have focused primarily on biologic and behavioral interventions, such as early detection and treatment of bacterial STDs, increasing consistent condom use, and delaying initiation of sexual activity.^{31–33} These prevention efforts, while vital, have been met with limited success, as evidenced by the persistence of a hidden epidemic of STDs in the United States.³⁴ This hidden epidemic of STDs seems linked to yet another hidden epidemic—that of child abuse and familial dysfunction. Our findings suggest that current STD prevention interventions, although necessary, may be insufficient attempts to apply short-term solutions to long-term social, environmental, and familial problems that often have their onset during childhood. The recent attention devoted by the American Academy of Pediatrics to the need for greater involvement of the pediatric community in child advocacy, through such broad avenues as promoting nurturing and nonviolent environments,^{35,36} is a historic step toward interventions that offer greater hope for being both timely and effective.

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