Adverse Childhood Experiences and Sexual Risk Behaviors in Women: A Retrospective Cohort Study

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Context: *Adverse childhood experiences such as physical abuse and sexual abuse have been shown to be related to subsequent unintended pregnancies and infection with sexually transmitted diseases. However, the extent to which sexual risk behaviors in women are associated with exposure to adverse experiences during childhood is not well-understood.*

Methods: *A total of 5,060 female members of a managed care organization provided information about seven categories of adverse childhood experiences: having experienced emotional, physical or sexual abuse; or having had a battered mother or substance-abusing, mentally ill or criminal household members. Logistic regression was used to model the association between cumulative categories of up to seven adverse childhood experiences and such sexual risk behaviors as early onset of intercourse, 30 or more sexual partners and self-perception as being at risk for AIDS.*

Results: *Each category of adverse childhood experiences was associated with an increased risk of intercourse by age 15 (odds ratios, 1.6–2.6), with perceiving oneself as being at risk of AIDS (odds ratios, 1.5–2.6) and with having had 30 or more partners (odds ratios, 1.6–3.8). After adjustment for the effects of age at interview and race, women who experienced rising numbers of types of adverse childhood experiences were increasingly likely to see themselves as being at risk of AIDS: Those with one such experience had a slightly elevated likelihood (odds ratio, 1.2), while those with 4–5 or 6–7 such experiences had substantially elevated odds (odds ratios, 1.8 and 4.9, respectively). Similarly, the number of types of adverse experiences was tied to the likelihood of having had 30 or more sexual partners, rising from odds of 1.6 for those with one type of adverse experience and 1.9 for those with two to odds of 8.2 among those with 6–7. Finally, the chances that a woman first had sex by age 15 also rose progressively with increasing numbers of such experiences, from odds of 1.8 among those with one type of adverse childhood experience to 7.0 among those with 6–7.*

Conclusions: *Among individuals with a history of adverse childhood experiences, risky sexual behavior may represent their attempts to achieve intimate interpersonal connections. Having grown up in families unable to provide needed protection, such individuals may be unprepared to protect themselves and may underestimate the risks they take in their attempts to achieve intimacy. If so, coping with such problems represents a serious public health challenge.*

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The adverse consequences of participating in high-risk sexual behaviors are disproportionately higher in women than in men. This disparity is influenced by a number of factors. Biologically, women are more susceptible to sexually transmitted infections. Also, women are more likely than men to have infections that are asymptomatic, and that thus remain undetected. Finally, women are at higher risk of complications than men.[1]

Furthermore, women singularly bear the health risks associated with pregnancy, which may affect both the mother and the newborn. The litany of outcomes associated with sexual risk behaviors in women includes the sexual transmission of more than 25 infectious organisms, cervical cancer, vaginal cancer, infertility, abortion, ectopic pregnancy, chronic pelvic pain, stillbirth, spontaneous abortion, violence-related trauma and death. Adverse outcomes that may occur in infants born to women engaging in risky sexual behaviors include low birth weight, prematurity, pneumonia, ocular infections, neurological damage and death.[2]

This article addresses whether childhood adversity, including exposure to household dysfunction and varying forms of abuse and violence, has long-term consequences on sexual risk behaviors. While childhood sexual or physical abuse have been associated with subsequent increases in substance abuse, sexual risk behavior, psychological morbidity and violence,[3] other measures of household dysfunction have received less attention. It is becoming increasingly clear that sexual abuse rarely occurs in a vacuum. Rather, abuse typically takes place within a broader context of adversity, including familial dysfunction, deprivation and destructiveness.[4]

Our analysis uses data from the Adverse Childhood Experiences Study,* which assessed the relationship between adverse experiences during childhood and adult diseases and health behaviors associated with leading causes of death and disability in the United States.[5] The adverse childhood experiences examined in this study are physical abuse; verbal abuse; sexual abuse; witnessing of intimate partner violence; and living with adult family members who are substance abusers, who are mentally ill or suicidal, or who have been imprisoned.

Adverse childhood experiences were endemic in the study population: Half of the adult participants in the study reported having had such experiences during childhood.[6] Further, previous reports using these data showed that exposure to adverse childhood experiences was associated with significantly increased risks of major causes of death and disability in adults, including alcoholism, drug abuse, depression, suicide, smoking, poor self-rated health, physical inactivity, severe obesity, ischemic heart disease, cancer, chronic lung disease, skeletal fractures and liver disease.[7]

Earlier publications from the Adverse Childhood Experiences Study have also demonstrated a strong association between exposure to adverse childhood experiences and two reproductive health outcomes—unintended pregnancy and

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sexually transmitted disease (STD) infection.[8] For both men and women, increases in exposure to adverse childhood experiences were associated with increases in the risk of STDs.[9]

Similarly, women exposed to multiple types of adverse childhood experiences had a 50% increase in the likelihood of an unintended first pregnancy (i.e., one that was unwanted or occurred before the woman had intended to become pregnant).[10] Prevention of unintended pregnancy is critical, since half of such pregnancies end in abortion. Moreover, those who have a live birth are at a significantly increased risk of maternal and infant complications.[11]

We evaluate here the association between seven adverse childhood experiences and three sexual risk behaviors associated with STDs and unintended pregnancy—onset of sexual intercourse by age 15, multiple sexual partners and self-reported risk of HIV and AIDS. These behaviors may be the mechanism through which adverse childhood experiences increase STDs and unintended pregnancy.

Methods

Study Participants

The methods used in this retrospective cohort study have been described elsewhere.[12] Study participants were adults ages 25 and older who were members of Kaiser Permanente in San Diego, California. All had been continuously enrolled between 1992 and 1995. Each year, approximately 80% of members (nearly 50,000) who were continuously enrolled during this period received a standardized biopsychosocial and medical evaluation at the primary care clinic.

Kaiser health plan members were eligible to participate if they had completed standardized medical examinations at the primary care clinic from August to November 1995 or from January to March 1996. A total of 13,494 eligible members received a mailed questionnaire one week following their clinic visit. This questionnaire addressed health behaviors and adverse childhood experiences, was administered in English, included 60 questions and required 45 minutes to complete. The questionnaire, which was developed by a multidisciplinary team, adapted many questions from previously used survey instruments, including the Conflict Tactics Scale[13] and questions developed by Gail Wyatt, an expert in the field of defining childhood sexual abuse.[14]

A total of 70.5% (9,508) of eligible participants returned questionnaires. Nonrespondents did not differ from respondents by gender, education or history of childhood sexual abuse (as indicated in the women's medical records). Compared with nonrespondents, respondents were slightly older (57 vs. 49) and were more likely to be white (84% vs. 75%). For the purposes of this article, in which we evaluate the association between adverse childhood experiences and at-risk sexual behaviors, we included all female respondents for whom we had complete information on race and education.

Definitions

All questions about adverse childhood experiences pertained to experiences during the respondent's first 18 years of life. Each category of abuse and household dysfunction (having been abused verbally; having been abused physically; having been abused sexually; reporting that their mother had been treated violently; having lived with household members who were substance abusers; having lived with household members who were mentally ill or suicidal; or having lived with household members who had ever been imprisoned) has been described in detail.[15] A number of questions were taken from the Conflict Tactics Scale; the response categories for these questions included never, once or twice, sometimes, often or very often.

- *Verbal abuse.* Verbal abuse was determined from answers to the following questions from the Conflict Tactics Scale: "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 Conflict Tactics Scale were used to describe physical abuse during childhood. These 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 used in previous work[16] were adapted to create the following question on 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 five years older than themselves. These experiences may have involved a relative, family friend or stranger. During the first 18 years of [your] 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" reply to any of these four questions defined a participant as having experienced sexual abuse during childhood.
- *Battered mother.* Four questions were used from the Conflict Tactics Scale 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 one of the first two ques-

Table 1. Percentage distribution of women in study population, by selected characteristics, Kaiser Permanente, 1995–1996 (N=5,060)

Characteristic	%
Age at interview	
19–34	11.6
35–49	26.2
50–64	30.8
≥65	31.4
Race/ethnicity	
White	77.2
Black	4.9
Hispanic	6.4
Asian	7.5
American Indian	0.4
Other	3.6
Education	
Some high school	7.6
High school graduate	23.2
Some college	32.6
College graduate	36.6
Employment*	
Full-time	40.5
Part-time	11.9
Retired/unemployed	47.6
Currently married†	
Yes	67.0
No	33.0

*Sample is incomplete, due to missing data for 342 cases. †Includes those who were living as married (i.e., cohabiting).

Table 2. Number and percentage of women reporting selected STD and HIV risk factors, by experience with adverse childhood experiences, and relative risk of such experiences

Adverse experience	1st sex ≤15			Self-perceived AIDS risk			≥30 partners		
	N	%	Relative risk	N	%	Relative risk	N	%	Relative risk
Physical abuse									
Yes	179	12.9	2.0 (1.6–2.4)	67	4.7	1.7 (1.3–2.3)	47	3.6	2.2 (1.5–3.1)
No (ref)	222	6.5	1.0	97	2.7	1.0	55	1.7	
Verbal abuse									
Yes	112	16.7	2.4 (1.9–2.9)	37	5.3	1.8 (1.3–2.6)	38	6.1	3.8 (2.6–5.4)
No (ref)	289	7.0	1.0	127	3.0	1.0	64	1.6	1.0
Sexual abuse									
Yes	187	15.7	2.6 (2.2–3.2)	64	5.2	2.0 (1.4–2.6)	48	4.3	2.8 (1.9–4.0)
No (ref)	214	6.0	1.0	100	2.7	1.0	54	1.7	1.0
Battered mother									
Yes	98	15.2	2.1 (1.7–2.6)	47	7.1	2.6 (1.9–3.6)	20	3.3	1.6 (0.99–2.6)
No (ref)	303	7.3	1.0	117	2.7	1.0	82	2.1	1.0
Incarcerated family member									
Yes	29	17.3	2.3 (1.5–3.0)	13	7.6	2.4 (1.4–4.2)	8	4.9	2.3 (1.1–4.5)
No (ref)	369	8.1	1.0	150	3.2	1.0	94	2.2	1.0
Household substance abuse									
Yes	198	14.6	2.5 (2.1–3.0)	64	4.6	1.7 (1.2–2.3)	49	3.9	2.4 (1.7–3.5)
No (ref)	203	5.9	1.0	100	2.0	1.0	53	1.6	1.0
Household mental illness									
Yes	123	12.1	1.6 (1.3–2.0)	47	4.5	1.5 (1.1–2.1)	47	5.0	3.3 (2.3–4.7)
No (ref)	278	7.4	1.0	117	3.0	1.0	55	1.5	1.0

tions or any response other than "never" to at least one 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 Survey[17] addressed whether the respondent, during her or his childhood, lived with a substance user. The questions were: "During your first 18 years of life, did you live with anyone who was a problem drinker or alcoholic?" and "During the first 18 years of life, did you live with anyone who used street drugs?" An affirmative response to either question indicated childhood exposure to substance abuse in the household.

•*Mental illness in the 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 exposed to mental illness. The questions used to measure such exposure were: "During your first 18 years of life, was anyone in your household depressed or mentally ill?" and "During your first 18 years of life, did anyone in your household attempt to commit suicide?"

•*Incarcerated household member.* If anyone in the household had gone to prison during the respondent's childhood, this was defined as childhood exposure to an incarcerated household member. The question was: "During your first 18 years of life, did anyone in your household go to prison?"

•*At-risk sexual behaviors.* Information about risky sexual behaviors was obtained as part of the standard medical history in the adult health clinic and through the self-administered adverse childhood experiences questionnaire. The three questions (and the possible responses) used were: 1) "How old were you the first time you had sexual intercourse?" (age in years); 2) "With how many different partners have you ever had sexual intercourse?" (number of partners); and 3) "Are you concerned [that] you are at risk for AIDS?" (yes/no). Participants who reported having initiated intercourse by age 15 or who had more than 30 partners in their lifetime* were considered to have engaged in risky sexual behavior.

*We chose 30 as the cut-off point for lifetime number of sexual partners because preliminary analyses showed adverse childhood experiences to be associated with this variable in a dose-response fashion.

Statistical Analyses

Persons with incomplete information about an adverse childhood experience were considered not to have had that experience. Analyses using this classification were almost identical to analyses that excluded participants with incomplete information. We estimated the association between each of the seven categories of adverse childhood experiences and having begun intercourse at or before age 15, having had 30 or more partners and perceiving oneself to be at risk of AIDS, using separate logistic regression models to obtain adjusted odds ratios and 95% confidence intervals.[18] Findings were statistically significant if the confidence intervals did not include the null value of 1.0.

We used the Mantel-Haenszel chi-square test for linear trend in proportions to evaluate whether the prevalence of risky sexual behavior increased as the number of categories of adverse childhood experiences (classified as 0, 1, 2, 3, 4–5 or 6–7) increased.[19] Covariates in all models included age and race (defined as other vs. white).

Results

For the purposes of the analysis, we included survey data from a total of 5,060 women. Characteristics of this study population have been reported previously.[20] In brief, the majority were 35 and older at the time of interview (88%), were white (77%), had some college education (69%), were currently married (67%), and were either employed full-time (41%) or retired or unemployed (48%) (Table 1, page 207).

More than half of women (59%) reported one or more types of adverse experience during childhood. Three percent of the study population reported a self-perceived risk of AIDS, 2% reported having had 30 or more sex partners and 8% had initiated intercourse at age 15 or younger (not shown).

Among the women who had had any one of the types of adverse experiences, the proportion who had had sex by age 15 ranged from 12% to 17%, while among those who had not had an adverse childhood experience, these proportions ranged from 6% to 8% (Table 2). Thus, the relative risks of having intercourse before age 15 were significantly associated with each of

Table 3. Percentage of women reporting sexual risk behavior, by number of types of adverse childhood experiences, and odds ratios showing association between number of types of experiences and risk behavior

No. of types	1st sex <15		Self-perceived AIDS risk		≥30 partners	
	%	Odds ratio	%	Odds ratio	%	Odds ratio
0	3.9	1.0	2.3	1.0	1.0	1.0
1	7.4	2.0	2.9	1.3	1.8	1.9
2	11.4	3.2	3.3	1.5	2.3	2.4
3	11.0	3.1	4.7	2.1	4.3	4.6
4–5	18.8	5.8	5.3	2.4	5.1	5.5
6–7	30.5	10.9	15.1	7.7	12.3	14.4

Table 4. Adjusted odds ratios (and 95% confidence intervals) showing relationship between number of types of exposure to adverse childhood experiences and selected STD and HIV risk factors

No. of experiences	1st sex <15	Self-perceived AIDS risk	≥30 partners
0 (ref)	1.0	1.0	1.0
1	1.8 (1.32–2.52)	1.2 (0.73–1.82)	1.6 (0.86–3.11)
2	2.8 (2.00–3.86)	1.3 (0.75–2.09)	1.9 (0.93–3.74)
3	2.5 (1.73–3.65)	1.7 (1.00–2.83)	3.5 (1.82–6.82)
4–5	4.5 (3.17–6.26)	1.8 (1.10–3.10)	3.8 (2.00–7.31)
6–7	7.0 (4.12–11.87)	4.9 (2.49–9.61)	8.2 (3.51–19.22)

Notes: All odds ratios are adjusted for age at interview and race. ref=reference group.

the seven categories of adverse childhood experiences: physical abuse (relative risk, 2.0), verbal abuse (relative risk, 2.4), sexual abuse (relative risk, 2.6), having a battered mother (relative risk, 2.1), having an incarcerated family member (relative risk, 2.3), observing household substance abuse (relative risk, 2.5) and observing household mental illness (relative risk, 1.6).

Likewise, among women who experienced adverse events during childhood, the percentages who perceived themselves to be at risk of AIDS ranged from 5% to 8%; in contrast, among those who did not have a specified adverse experience, these percentages ranged from 2% to 3%. A significantly increased probability of perceiving oneself to be at risk of AIDS was thus associated with physical abuse (1.7), verbal abuse (1.8), sexual abuse (2.0), having a battered mother (2.6), having an incarcerated family member (2.4), observing household substance abuse (1.7) and observing household mental illness (1.5).

Finally, among women with at least one adverse childhood experience, the proportions with 30 or more sexual partners ranged from 3% to 6%, while among those with no adverse experience, this proportion was about 2%. Having 30 or more partners was significantly associated with six of the seven categories of adverse childhood experiences—physical abuse (2.2), verbal abuse (3.8), sexual abuse (2.8), an incarcerated family member (2.3), household substance abuse (2.4) and household mental illness (3.3). Having a battered mother was associated with a borderline increased risk (1.6). Of all associations between individual categories of adverse childhood experiences and sexual risk behaviors in women that were considered, the strongest association was between verbal abuse and having 30 or more sex partners (relative risk, 3.8).

The prevalence of early onset of sexual intercourse, of having 30 or more partners and of feeling at risk of AIDS increased as the number of categories of exposure to adverse experiences during childhood increased (Table 3). The prevalence of early onset of intercourse ranged from 4% for those reporting no adverse childhood experiences to 31% for those reporting 6–7 types of experiences. Similarly, 2% of women reporting no exposure to adverse childhood experiences reported feeling at risk of AIDS, compared with 15% of those exposed to 6–7 types of adverse childhood experiences. Likewise, only 1% of those with no exposure to adverse childhood experiences had 30 or more partners, compared with 12% of those reporting 6–7 types of adverse experiences. Although the prevalence of sexual risk behaviors among those experiencing 6–7 types of adverse childhood experiences was notably higher than that for women experiencing a lower number of categories of adverse childhood experiences, it is worth noting that even in the highest-risk groups, the majority of the study population did not report risky sexual behaviors.

Unadjusted odds ratios for sexual risk behavior generally rose with increasing exposure to adverse childhood experiences. Thus, for early onset of intercourse, odds ratios rose from 2.0 among those with one type of adverse experience to 10.9 among women with 6–7 such experiences (p for trend, <.000001). Likewise, for perceiving oneself as being at risk of AIDS, odds ratios climbed from 1.3 to 7.7 (p for trend, <.000001), and for having 30 or more partners, odds ratios rose from 1.9 to 14.4 (p for trend, <.000001). Moreover, when the number of partners was evaluated as a continuous variable, results showed that the mean number increased as the number of categories of adverse childhood experiences rose, from 3.6 among those with no adverse experiences to 5.0 among those with one, 6.1 among those with two, 7.5 among those with three, 10.2 among those with 4–5 and 28.7 among those with 6–7 (not shown).

When we adjusted for the effects of age and race, the odds ratios for having 30 or more partners and for perceiving oneself as being at risk of AIDS steadily increased with increasing exposure to types of adverse childhood experiences (Table 4). The odds of having 30 or more partners climbed from 1.6 among those with one type of adverse experience to 8.2 among those with 6–7 such experiences, and the odds of feeling at risk of AIDS rose from 1.2 to 4.9, respectively. Adjusted analyses showed a similar pattern for the association between early onset of intercourse and adverse childhood experiences, with odds ratios ranging from 1.8 among those with one type of adverse experience to 7.0 among those with 6–7. Compared with women who had experienced no types of adverse childhood experiences, those who experienced one or more of them were significantly and increasingly more likely to initiate intercourse at ages 15 years and younger (Table 4).

In further analyses, we focused on measures of exposure to household violence for which frequency of exposure could be evaluated. These included physical abuse, verbal abuse or having a battered mother. As exposure to physical abuse increased from rarely or never to often or very often, the prevalence of early initiation of intercourse increased from 7% to 20% (Table 5), the prevalence of self-per-

Table 5. Percentage of women reporting sexual risk behavior, by frequency of selected adverse childhood experiences, and adjusted odds ratios showing relationship between exposure and risk behavior

Experience and frequency	1st sex <15		Self-perceived AIDS risk		≥30 partners	
	%	Odds ratio	%	Odds ratio	%	Odds ratio
Physical abuse						
Often/very often	19.6	2.8 (2.1–4.0)	6.6	2.2 (1.3–3.7)	8.9	4.3 (2.6–7.1)
Sometimes	11.0	1.5 (1.2–1.9)	4.4	1.5 (1.0–2.2)	2.6	1.3 (0.8–2.2)
Rarely/never (ref)	7.0	1.0	2.8	1.0	1.7	1.0
Verbal abuse						
Often/very often	17.7	2.7 (2.1–3.5)	5.6	1.8 (1.2–2.8)	6.7	3.8 (2.4–6.0)
Sometimes	10.1	1.5 (1.2–2.0)	3.9	1.3 (0.9–1.9)	2.6	1.6 (0.9–2.6)
Rarely/never (ref)	6.1	1.0	2.7	1.0	1.4	1.0
Mother was hit						
Often/very often	20.1	2.5 (1.8–3.6)	6.2	1.7 (1.0–3.1)	5.6	2.2 (1.2–4.3)
Sometimes	13.2	1.8 (1.3–2.6)	8.1	2.8 (1.8–4.4)	2.5	1.2 (0.6–2.5)
Rarely/never (ref)	7.4	1.0	2.8	1.0	2.1	1.0

Notes: All odds ratios are adjusted for age at interview and race. ref=reference group.

ceived risk for AIDS climbed from 3% to 7% and the prevalence of having 30 or more sexual partners rose from 2% to 9%. Similarly, increases in the frequency of verbal abuse were consistently associated with increases in believing oneself to be at risk of AIDS, in having 30 or more partners and in initiating intercourse at an early age. Increased exposure to a mother's being battered (from rarely or never to sometimes to often or very often) was also associated with a steady increase in the prevalence of having 30 or more partners (from 2% to 6%) and in the prevalence of initiating intercourse early (from 7% to 20%). Our findings regarding the dose-response association between sexual risk behaviors and adverse childhood experiences were robust: After adjusting for age and race, we found that the odds ratios for sexual risk behaviors increased along with the frequency of childhood exposure to physical and verbal abuse.

Discussion

Each of seven categories of childhood adversity that we evaluated in this article was associated with increases in the risk of early onset of intercourse, multiple sexual partners and self-perceived risk of AIDS. As the frequency of exposure to violence during childhood increased (including physical abuse, verbal abuse and having a battered mother), the likelihood of experiencing an early onset of intercourse and having 30 or more lifetime sex partners also increased. Finally, as the number of categories of adverse childhood experiences increased, the prevalence of early onset of intercourse, of having 30 or more partners and of feeling at risk of AIDS consistently increased.

Previous reports have identified a number of risk factors for initiating intercourse at an early age and for having multiple partners. These include living in poverty, having parents with low levels of education, living in single-parent families, being young at menarche, performing poorly in school, having low church attendance, lacking parental support, using alcohol, smoking, using drugs, having school problems, dating at an early age, having sexually active friends,[21] being unable to discuss sex, feeling depressed, lacking college or career plans and being exposed to sexual images through television and the Internet.[22] To our knowledge, ours is one of the few large-scale studies to demonstrate an association between childhood abuse and household dysfunction and sexual risk behaviors that may appear later in adolescent or adult life.

Our findings suggest that increases in sexual risk behaviors appear to mediate the relationship that previous reports have demonstrated between adverse childhood experiences and unintended pregnancy and STDs.[23] Unfortunately, we do not have data to evaluate the diverse physiological, psychological, cognitive, social and cultural mechanisms by which exposure to family dysfunction during childhood may influence subsequent sexual risk behaviors. However, it is possible that the sexual risk behaviors of individuals with histories of adverse childhood experiences represent desperate attempts to achieve intimate interpersonal connections. Growing up in families unable to provide needed protection, these individuals may be unprepared to protect themselves and may grossly underestimate the risks they are taking in their hopeful, yet potentially misguided, attempts to achieve the intimacy that may have been lacking in their childhood.[24] If hope and optimism for the future are meager, risky behaviors may appear to have less potential for negative impact.

We considered limitations that may have influenced the validity of our findings. First, all information on exposure to familial dysfunction and household violence and on sexual risk behaviors was collected by self-report, and for the adverse childhood experiences involved a considerable period of recall. The challenges of measuring sexual abuse have been clearly described; we therefore used measures that had been used previously by experts in the field.[25] The social stigma that can be associated with these risk behaviors probably led to their being underreported. It is unclear whether those who had experienced childhood adversity would be more likely to underreport sexual risk behaviors than those who had not experienced such adversity. In addition, our analysis would have been strengthened if data on nonuse of condoms had been available.

Finally, we cannot be certain that sexual risk behaviors always followed, rather than preceded, exposure to adverse childhood experiences, since a number of participants may have both participated in sexual risk behaviors and experienced adverse childhood experiences during adolescence. However, the focus of most of the questions regarding adverse childhood experiences was on events occurring during childhood; therefore, it is highly likely that most sexual risk behaviors followed, rather than preceded, the onset of exposure to adverse childhood experiences. In fact, it is counterintuitive that for the majority of the study participants, they first developed sexual risk behaviors, which then caused their families to become adversity-ridden. Future investigations would be strengthened by measuring the age at which exposure to adverse childhood experiences began.

To date, common public health interventions that have focused on reducing sexual risk behaviors include delaying initiation of sexual intercourse and increasing use of condoms.[26] Interventions that have focused on changing these sexual risk behaviors have met with only modest success,[27] which suggests that programs attempting to alter sexual behaviors after their development may be insufficient to achieve the desired magnitude of change. Broader interventions that focus on reducing exposure to familial violence and household dysfunction, such as public health nurse home visitation during the early years of life, have been shown to achieve their desired goals.[28] Such interventions, though more challenging, may ultimately lead to greater reductions in sexual risk behaviors decades later.

We have shown that high-risk adolescent and adult sexual behaviors are highly correlated with adverse childhood experiences. The failure of current public health attempts to alter many of these behaviors may well be a result of not recognizing that, for the people involved, these behaviors may also be a desperate search for affection and intimacy brought on by lack of these factors during childhood. In that instance, the public health "problem" may also represent a personal quest for a solution to these basic human needs. Understanding this may offer us a new way to approach old problems.

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