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Adverse childhood experiences and personal alcohol abuse as an adult

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Abstract

Adult alcohol abuse has been linked to childhood abuse and family dysfunction. However, little information is available about the contribution of multiple adverse childhood experiences (ACEs) in combination with parental alcohol abuse, to the risk of later alcohol abuse. A questionnaire about childhood abuse, parental alcoholism and family dysfunction while growing up was completed by adult HMO members in order to retrospectively assess the independent relationship of eight ACEs to the risk of adult alcohol abuse. The number of ACEs was used in stratified logistic regression models to assess their impact on several adult alcohol problems in the presence or absence of parental alcoholism. Each of the eight individual ACEs was associated with a higher risk alcohol abuse as an adult. Compared to persons with no ACEs, the risk of heavy drinking, self-reported alcoholism, and marrying an alcoholic were increased twofold to fourfold by the presence of multiple ACEs, regardless of parental alcoholism. Prevention of ACEs and treatment of persons affected by them may reduce the occurrence of adult alcohol problems.

Keywords: Child abuse; Alcoholism; Dysfunctional family; Alcohol abuse

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1. Introduction

The damaging effects of alcoholism are felt not just by alcoholics themselves; often there are unintended and unrecognized detrimental consequences among their children. The historical tendency to focus on alcohol-related outcomes such as motor vehicle accidents, cirrhosis of the liver, and harmful effects on pregnancy may have unintentionally diverted attention away from the burden that is borne by children of alcoholics (US Department of Health and Human Sevices, 1997). Growing up with an alcoholic parent often means enduring the stress and trauma of a dysfunctional or chaotic home life, witnessing domestic violence, and experiencing childhood abuse, all of which can have a lifelong negative impact (Anda et al., 1999; Dietz et al., 1999; Felitti et al., 1998; Lykken, 1997; Resnick et al., 1997).

Alcoholism is thought to be multifactorial. Children who grow up with alcohol-abusing parents have both familial and experiential factors that increase their risk for alcoholism (Johnson & Leff, 1999). Many studies have shown a relationship between childhood abuse and the risk of alcohol misuse and abuse as an adult (Kunitz, Levy, McColoskey, & Gabriel, 1998; Langeland & Hartgers, 1998). However, these studies have tended to focus on single types of abuse and/or female populations. Few studies have examined multiple types of abuse simultaneously or have considered the consequences among males. In fact, childhood abuse tends to be highly interrelated with other adverse childhood experiences (ACEs), such as growing up with parents impaired by alcohol or drugs, domestic violence, parental marital discord, mental illness in the home, and crime (Felitti et al., 1998). Therefore, improvements in the understanding of alcohol abuse need to take into account the tendency for these experiences to be clustered together and their interaction with other familial factors.

The contribution of ACEs and parental alcohol abuse to the risk of alcohol misuse and abuse in the next generation is of substantial importance to medicine and public health. We hypothesize that ACEs and alcohol use and abuse are part of a cyclical pathway. In this study, we examine the relationship of eight ACEs to the later risk of heavy alcohol use, self-reported alcohol abuse, and alcoholism, stratified by a history of parental alcohol abuse. To provide additional insight into possible intergenerational cycling of alcohol abuse, we also assess the relationship of these experiences to the risk of marrying an alcoholic.

2. Method

2.1. Study population

The ACE Study involved adults visiting Kaiser Permanente's San Diego Health Appraisal Clinic. The overall objective of this study was to assess the impact of ACEs on a wide variety of health behaviors and outcomes and on health care utilization (Felitti et al., 1998). The baseline data collection was divided into two survey waves that used the same methodology described below (Felitti et al., 1998). Prior publications from the ACE Study included respondents to the Wave I survey (9508/13,494; 70% response) that was conducted between

August and November of 1995 and between January and March of 1996 (Anda et al., 1999; Dietz et al., 1999; Edwards et al., in press; Felitti et al., 1998). The Wave II survey was conducted between June and October of 1997; 8667 of 13,330 persons (65%) responded. Thus, the final study cohort had an overall response rate of 68% (18,175/26,824). The Wave II ACE Study questionnaire contained some additional questions to obtain more detailed information about health topics that analysis of Wave I data had shown to be important (Dietz et al., 1999; Felitti et al., 1998).

The ACE Study was approved by the Institutional Review Boards of the Southern California Permanente Medical Group (Kaiser Permanente), Emory University, and the Office of Protection from Research Risks, National Institutes of Health.

2.1.1. Assessment of possible bias due to nonresponse

As part of the study methods for Wave I, we abstracted data from the standardized medical evaluations for both respondents and nonrespondents to the ACE Study questionnaire. This was important because the ACE Study questionnaire was lengthy and also contained questions about sensitive topics that may have yielded no responses.

Nonrespondents tended to be somewhat younger or be in racial/ethnic minority groups, a finding consistent with many other studies (Edwards et al., 2001). We found no differences between respondents and nonrespondents with regard to their health risk behaviors (such as smoking, obesity, alcohol, or drug abuse) or common disease conditions (such as diabetes, hypertension, chronic lung disease, cardiovascular diseases, or cancer). Because only variables associated with nonresponse (demographic factors) can be controlled for in our analyses, we can eliminate their possible influence on our results by means of multivariate analysis.

Furthermore, after adjusting for differences in age and race, analysis of the strength of the relationship between a history of sexual abuse and health behaviors and outcomes for respondents and nonrespondents yielded virtually identical results (Edwards et al., 2001). Thus, there is no evidence that the respondents were more likely to associate their health-related problems with a childhood history of sexual abuse.

2.1.2. Exclusion from the study cohort

After exclusion of 17 respondents with missing information about race and 67 with missing information about educational attainment, the final study cohort included 99% of the respondents (17,337/17,421). Because data on alcohol consumption throughout adult life were available for Wave II only, the sample size for assessing ever heavy drinking was reduced. After exclusion for missing data on race and education, the sample size for assessment of ever heavy drinking using Wave II data was 8629.

2.2. Definitions of ACEs

All questions about ACEs pertained to the respondents' first 18 years of life. For questions adapted from the Conflict Tactics Scale (CTS; Straus & Gelles, 1990), the response categories were *never*, *once or twice*, *sometimes*, *often*, or *very often*.

2.2.1. Verbal abuse

Verbal abuse was determined from answers to two questions from the CTS: (1)"How often did a parent, stepparent, or adult living in your home swear at you, insult you, or put you down?" (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.

2.2.2. Physical abuse

Two questions from the CTS were used to describe childhood physical abuse: "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?" A respondent was defined as being physically abused if either the response was *often* or *very often* to the first question or *sometimes*, *often*, or *very often* to the second.

2.2.3. Sexual abuse

Four questions from Wyatt (1985) 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* response to any one of the four questions classified a respondent as having experienced contact sexual abuse during childhood.

2.2.4. Battered mother

We used four questions from the CTS to define childhood exposure to a battered mother. "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 either of the first or second question or any response other than *never* to either the third or the fourth question defined a respondent as having had a battered mother.

2.2.5. Household substance abuse

Two questions asked whether the respondent, during his or her childhood, lived with a problem drinker or alcoholic (Schoenborn, 1995) or with anyone who used street drugs. An affirmative response to living with a brother, sister, other relative, other nonrelative, or anyone who used street drugs indicated childhood exposure to substance abuse in the

household. Growing up with an alcohol-abusing mother or father *was not* included in this definition, because this information was used as a separate variable to stratify respondents according to parental history of alcoholism.

2.2.6. Mental illness in household

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

2.2.7. Parental separation or divorce

This ACE was defined as a *yes* response to the question "Were your parents ever separated or divorced?"

2.2.8. Incarcerated household members

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

2.3. Definition of alcohol use/misuse

For drinking behaviors an ever heavy drinker was defined as someone who consumed at least 14 drinks per week during any 10-year period from age 19 years to the present (Wave II only); self-reported alcohol abuse as a *yes* response to "Have you ever had a problem with your use of alcohol?"; a self-reported alcoholic as a *yes* response to "Have you ever considered yourself an alcoholic?"; ever married an alcoholic as a *yes* response to "Have you ever been married to someone (or lived with someone as if you were married) who was a problem drinker or an alcoholic?"

2.4. Statistical analysis

Persons with incomplete information about an ACE were considered not to have had that experience. This would likely result in conservative estimates of the relationships between ACEs and alcohol abuse because persons who had potentially been exposed to an experience would always be misclassified as unexposed. This type of misclassification would, in turn, bias our results toward the null (Rothman, 1986). To assess this potential effect, we repeated our analyses after excluding any respondent with missing information on any of the ACEs and found no differences in the final results.

Adjusted odds ratios (OR) and 95% confidence intervals (CI) were obtained from logistic regression models that assessed the associations between each of the eight categories of ACE and alcohol misuse and abuse. The number of ACEs was summed for each respondent (range: 0–8); analyses were repeated with the summed score as an ordinal variable (0, 1, 2, 3, ≥ 4) or as four dichotomous variables (yes/no) with zero experiences as the referent. Covariates in all models included age, sex, race (other vs. white), and education (high school diploma, some college, or college graduate vs. less than high school).

To assess whether the relationship between the ACEs and alcohol abuse was affected by having parents with a history of alcoholism, we stratified all of our analyses by the presence or absence of having one or two alcoholic parents.

3. Results

3.1. Characteristics of study population

The study population included 9367 (54%) women and 7970 (46%) men. The mean age (±S.D.) was 56 (±15.7) years for women and 58 (±14.6) years for men. Seventy-three

Table 1
Prevalence of parental alcoholism, ACEs, and personal alcohol use and abuse during adulthood by gender

	Prevalence (%)		
	Women ($n=9367$)	Men ($n=7970$)	Total ($N=17,337$)
Parental alcoholism			
Neither parent	76.3	81.5	78.7
At least one parent	23.7	18.5	21.3
Father only	17.6	14.0	15.9
Mother only	2.6	1.9	2.3
Both parents	3.5	2.6	3.1
ACEs			
Emotional abuse	13.1	7.6	10.5
Physical abuse	27.0	29.9	28.3
Sexual abuse	24.7	16.0	20.7
Battered mother	13.7	11.5	12.7
Household substance abuse	12.9	10.2	11.6
Mental illness in household	23.3	14.8	19.4
Parental separation or divorce	24.5	21.8	23.2
Incarcerated household member	5.2	4.1	4.7
Number of ACEs			
0	38.0	41.3	39.5
1	25.1	28.5	26.6
2	14.7	15.3	14.9
3	9.7	7.5	8.7
≥4	12.6	7.4	10.2
Alcohol use/misuse			
Ever heavy drinker[a]	5.9	21.7	13.2[a]
Self reported alcohol problem	4.0	6.3	10.1
Self reported alcoholic	2.2	4.0	6.3
Ever married an alcoholic	14.3	4.0	18.2

[a] Ever heavy drinker reported from Wave II only, where study population is comprised of 4674 women and 3955 men.

percent of women and 76% of men were white; 47% of women and 53% of men were college graduates; another 37% of women and 34% of men had some college education. Only 8% of women and 6% of men did not graduate from high school.

Twenty-four percent of women and 18% of men reported that at least one of their parents was an alcoholic (Table 1). As expected, the likelihood of having grown up with an alcoholic father was substantially higher than having grown up with an alcoholic mother: 18% vs. 3% for women, 14% vs. 2% for men, respectively.

With the exception of physical abuse, the prevalence of each category was higher for women than for men (Table 1). At least one of the eight categories of ACEs was reported by 61% of respondents. The prevalence of self-reported adult alcohol misuse was higher among men than women but the prevalence of marrying an alcoholic was higher among women than men.

3.2. Association between ACEs, parental alcoholism, and alcohol behaviors

We stratified self-reported adult alcohol problems by parental alcoholism and the gender of the respondent. In this analysis, we found that although the risk of adult alcohol problems was higher for men than for women, the relationship of parental alcoholism to adult alcohol problems did not differ between the two groups (Fig. 1). Findings were similar for the other alcohol outcomes (data not shown). The risk of adult alcohol outcomes was highest in persons reporting two alcoholic parents, followed by a high risk of the alcohol outcomes in both men and women who reported an alcoholic mother only. However, the differences between alcoholic parent groups were slight, and we assessed further relationships in terms of at least one alcoholic parent vs. neither. Having at least one alcoholic parent was associated

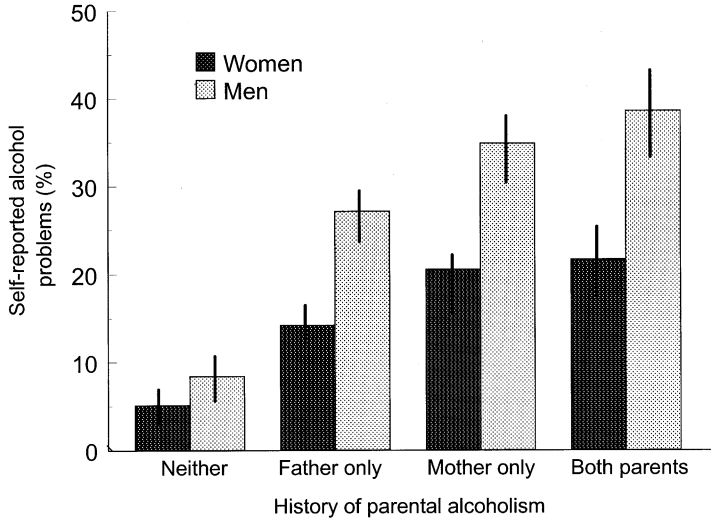

Fig. 1. Risk (%) of self-reported alcohol problems by parental alcoholism and gender. Vertical lines represent 95% confidence intervals, adjusted for demographic factors.

($P < .05$) with risk of ever heavy drinking, self-reported alcohol problems, self-reported alcoholism, and marrying an alcoholic in adulthood (Table 2). The risk of adult alcohol

Table 2
Risk/prevalence (%) of adult alcohol factors, by parental alcoholism and ACEs

	Prevalence (%)			
	Ever heavy drinking	Self-reported alcohol problems	Self-reported alcoholic	Ever married an alcoholic
Alcoholic parent				
No	11.1	7.1	4.1	15.5
Yes	20.5 *	21.4 *	14.6 *	28.1 *
*Category of ACE*** *				
Emotional abuse				
No	12.6	9.0	5.5	16.6
Yes	18.0	19.6	13.3	31.9
Physical abuse				
No	11.1	8.3	4.9	16.5
Yes	19.0	14.9	9.9	22.7
Sexual abuse				
No	12.5	8.9	5.5	15.8
Yes	15.6	15.0	9.5	27.4
Battered mother				
No	12.5	9.2	5.5	15.8
Yes	17.9	17.0	12.0	26.8
Substance abuse in home				
No	12.2	8.5	4.9	16.6
Yes	14.0	22.9	16.7	30.9
Mental illness in home				
No	12.9	8.5	5.3	16.1
Yes	14.0	17.1	10.4	27.1
Parents separated/divorced				
No	12.5	8.9	5.3	16.5
Yes	15.1	14.2	9.7	24.0
Incarcerated family member				
No	13.0	9.8	6.0	17.7
Yes	15.7	17.6	12.7	28.2
Number of ACEs				
0	10.2	5.7	3.1	12.2
1	12.5	8.7	5.2	17.1
2	15.7	12.7	7.8	20.9
3	16.1	14.5	10.4	26.2
≥ 4	19.9**	23.4**	16.0**	33.9**

* $P < .05$ in a logistic model adjusting for age at survey, race, sex, and educational attainment.

** $P < .05$ for an overall trend in a logistic model adjusting for age at survey, race, sex, and educational attainment.

*** $P < .05$ for every ACE and alcohol outcome comparison in a logistic model adjusting for age at survey, sex, race, and educational attainment.

Table 3
Relationship between number of ACEs and the risk of ever heavy drinking and self-reported alcohol problems, stratified by having grown up with at least one alcoholic parent

	Ever heavy drinking[a]				Self-reported alcohol problems			
	No alcoholic parents		At least one alcoholic parent		No alcoholic parents		At least one alcoholic parent	
Number of ACEs	%	Adjusted OR[b]	%	Adjusted OR[b]	%	Adjusted OR[b]	%	Adjusted OR[b]
0	9.4	1.0 (referent)	16.7	1.0 (referent)	4.9	1.0 (referent)	14.2	1.0 (referent)
1	11.4	1.3 (1.0–1.5)	17.3	1.1 (0.7–1.6)	7.2	1.4 (1.2–1.7)	16.1	1.2 (0.9–1.6)
2	13.7	1.6 (1.2–2.0)	21.0	1.5 (1.0–2.2)	9.5	1.9 (1.6–2.4)	21.2	1.7 (1.3–2.3)
3	11.7	1.4 (1.0–1.9)	22.0	1.7 (1.1–2.6)	9.9	2.1 (1.7–2.7)	21.4	1.8 (1.3–2.4)
≥4	14.7	2.2 (1.6–3.0)	24.2	2.1 (1.5–301)	15.0	3.6 (2.9–4.5)	30.7	3.1 (2.4–4.1)
Total	11.1		20.5		7.1		21.4	

[a] Ever heavy drinking reported from Wave II only, where $N = 8629$.
[b] OR adjusted for age at survey, race, sex educational attainment; 95% CI shown in parentheses.

outcomes was also higher among persons reporting any individual ACE than among persons with no ACE ($P < .05$). There was also a strong graded relationship ($P < .05$) between the ACE score and each adult alcohol outcome (Table 2). We found a strong relationship between each of the eight categories of ACEs and adult alcohol outcomes among persons with and without a history of parental alcoholism (data not shown). Furthermore, among persons with no ACEs, the risk of adult alcohol outcomes was higher among persons with alcoholic parents than those without alcoholic parents.

The relationships between the number of ACEs and the risk of adult alcohol outcomes were strong and graded for persons with and without an alcoholic parent ($P < .05$). Compared to adults with no ACEs, those with at least four ACEs had twice the likelihood of reporting ever heavy drinking and three times the likelihood of reporting alcohol problems in adulthood (Table 3). The highest risk of heavy drinking (24.2%) and self-reported alcohol problems

Table 4
Relationship between number of ACEs and the risk of adult alcoholism and ever marrying an alcoholic, stratified by having grown up with at least one alcoholic parent

	Self-reported alcoholic				Ever married an alcoholic			
	No alcoholic parents		At least one alcoholic parent		No alcoholic parents		At least one alcoholic parent	
Number of ACEs	%	Adjusted OR[a]	%	Adjusted OR[a]	%	Adjusted OR[a]	%	Adjusted OR[a]
0	2.5	1.0 (referent)	9.1	1.0 (referent)	11.4	1.0 (referent)	19.4	1.0 (referent)
1	4.1	1.6 (1.3–2.0)	10.6	1.2 (0.8–1.7)	16.0	1.5 (1.4–1.7)	22.4	1.3 (1.0–1.6)
2	5.3	2.0 (1.6–2.7)	14.6	1.8 (1.3–2.5)	18.9	1.9 (1.6–2.2)	26.2	1.5 (1.2–2.0)
3	7.3	3.0 (2.3–4.1)	15.0	1.9 (1.3–2.7)	23.1	2.2 (1.9–2.7)	30.9	1.9 (1.4–2.5)
≥4	9.7	4.4 (3.3–5.9)	21.4	3.1 (2.2–4.2)	28.4	3.0 (2.5–3.6)	38.6	2.6 (2.0–3.3)
Total	4.1		14.6		15.5		28.1	

[a] OR adjusted for age at survey, race, sex, and educational attainment; 95% CI shown in parentheses.

(30.7%) was observed among adults with both an ACE score of four or higher and a history of parental alcoholism. An ACE score of at least four, in contrast to a zero ACE score, was associated with fourfold risk of self-reported alcoholism among adults with no history of parental alcoholism and threefold risk of alcoholism among those with at least one alcoholic parent (Table 4). A threefold increase in the likelihood of marrying an alcoholic was associated with an ACE score of four or higher among adults both with and without a history of parental alcoholism (Table 4). Adults with an ACE score of at least four and a history of parental alcoholism also had the highest risk of self-reported alcoholism (21.4%) and marrying an alcoholic (38.6%) than other adults in the study. We also stratified by sex and found a strong graded relationship between ACEs and alcohol abuse outcomes for both women and men ($P < .0001$), with no significant differences in the OR between the two sexes (data not shown).

4. Discussion

ACEs showed a strong, graded relationship to each of our measures of alcohol misuse and abuse for persons either with or without a parental history of alcoholism. ACEs thus have an effect on the risk of alcohol misuse that is independent of parental alcoholism. For any given ACE score, the increase in the prevalence of alcohol abuse was always higher among persons with a parental history of alcoholism. This latter finding suggests that ACEs interact with heritable factors to greatly increase the likelihood of alcohol abuse or marriage to an alcoholic as an adult.

The graded relationship between the number of ACEs and the likelihood of marrying an alcoholic suggests another pathway that may contribute to an intergenerational cycle of alcohol abuse and ACEs. This association was present for both alcoholic and nonalcoholic study participants. ACEs are more common in alcoholic families (Anda et al., 1999; Felitti et al., 1998) and they greatly increase the risk of personal alcoholism or marriage to an alcoholic. This unfortunate scenario likely leads to a heightened risk of intergenerational cycle of ACEs.

Experiments with animals have shown increased consumption of alcohol when they are exposed to stressful situations (Higley & Bennett, 1999; Higley & Linnoila, 1997). Rhesus monkeys exposed to adverse experiences at early stages of life consume more alcohol at later stages, than do controls (Higley, Hasert, Suomi, & Linnoila, 1991). Recognition of negative experiences during early stages of development and improved understanding of the underlying biologic mechanisms and motives for drinking may lead to better treatment for persons who have been exposed to ACEs and who abuse alcohol.

A strength of the ACE Study is its capacity to examine the cumulative effect of multiple traumatic or chaotic childhood experiences that we have previously shown to be highly interrelated (Anda et al., 1999). In fact, the effect of having experienced multiple ACEs on the likelihood of alcohol abuse or marriage to an alcoholic was cumulative. This finding is consistent with a cumulative stressor model that we hypothesized and incorporated in the design of the ACE Study.

Because of the sample size of the study, we were able to examine the relationships of the eight types of ACEs to alcohol abuse in *both women and men*. Despite the fact that alcohol abuse is more common among males, most prior studies that investigated the influence of childhood abuse on the risk of alcoholism have tended to focus on women. Moreover, those studies that included men often had insufficient information for adequate study of these associations among males (Langeland & Hartgers, 1998). We found a strong association between the eight individual ACEs and alcohol misuse and abuse among men. Assessment of the associations of childhood sexual and physical abuse and related exposures, both individually and cumulatively, among men is critical since alcohol use and abuse is substantially greater among men (US Department of Health and Human Services, 1997).

Neurological development during early childhood is the foundation on which experiences, positive or negative, are organized and processed. Home and family environments and the characteristics of the parents and persons to whom children are exposed are powerful determinants of emotional, behavioral, cognitive, social, and physiologic functioning later in life (Perry & Pollard, 1998; Weiss & Wagner, 1998). As the brain processes information during early stages of life, an individual who experiences ACEs such as physical abuse would expectedly have an increased risk of psychological, behavioral, and social adjustment as an adult. Impaired psychological functioning would challenge the individual to find ways of coping with various psychopathological disorders, which may have resulted from the adverse experiences.

In adults, depression and anxiety have been linked to child sexual and physical abuse (Beichtman et al., 1992; Briere & Runtz, 1988; Jaffe, Wolfe, Wilson, & Zak, 1986). Furthermore, prior reports from the ACE Study showed an association between ACEs, depression, and smoking (Anda et al., 1999; Felitti et al., 1998). The presence of distress associated with depression or anxiety may compel persons experiencing them to use alcohol. This category of drinking has been labeled "drinking to cope" and is defined as the tendency to use alcohol to escape, avoid, or regulate unpleasant emotions (Abbey, Smith, & Scott, 1993).

Children of alcoholics are at a higher risk for abusing alcohol (Heath & Martin, 1994; Johnson & Leff, 1999; Sher, Walitzer, Wood, & Brent, 1991). Physiologic factors, such as a decreased response to alcohol, are postulated as modes of genetic transmission (Schuckit & Rayses, 1979; Schuckit, Parker, & Rossman, 1983). However, reports on genetic transmission of alcoholism among women have had mixed results. While studies suggest an important genetic component to alcoholism among men, consistent findings have not been obtained for women and some studies indicate that women are just as susceptible as men to a genetic predisposition (Johnson & Leff, 1999; Wiers, Sergent, & Gunning, 1994). Although there is ample evidence that heredity influences the risk of alcoholism, our findings strongly suggest that the common adverse experiences of childhood should be assessed and taken into consideration in efforts to prevent and treat alcohol abuse.

A potential weakness of our study is underreporting of alcohol use and abuse, ACEs, and parental alcohol use. However, if both the exposure (ACEs) and the outcome (alcohol use) are underreported, this would bias our results towards the null. Therefore, although our findings are strong, they probably underestimate the true strength of the relationships of ACEs to alcohol abuse or marriage to an alcoholic.

ACEs are common and strongly associated with subsequent alcohol abuse, and therefore are likely to account for a larger proportion of alcohol abuse. They affect the risk of alcohol abuse regardless of parental history, but for people with alcohol-abusing parents, they create a subpopulation at very high risk. These findings, taken with the tendency to marry an alcohol abuser, suggest a self-perpetuating cycle that puts the next generation at risk for both ACEs and alcohol abuse.

Our findings have important implications for the practices of medicine and public health. Early identification and treatment of alcohol-abusing parents and children exposed to ACEs may reduce the occurrence of alcohol use and abuse in adults. Furthermore, our results strongly support the notion that clinicians should identify persons at risk for alcohol abuse not solely on the basis of family history, but also by understanding the antecedent as well as the current domestic environment. Physicians who identify and treat alcoholic patients may also need to assist the children involved, and to take into consideration their greatly increased risk of ACEs and alcohol abuse. Thus it may be useful for alcohol treatment programs for adults to incorporate prevention and treatment of ACEs in affected families and to educate participants and family members about child development and the burden that ACEs place on the next generation.

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