Pergamon

Child Abuse & Neglect 25 (2001) 1627–1640

Child Abuse & Neglect

Growing up with parental alcohol abuse: exposure to childhood abuse, neglect, and household dysfunction☆

Shanta R. Dube*[,a], Robert F. Anda[a], Vincent J. Felitti[b], Janet B. Croft[a], Valerie J. Edwards[a], Wayne H. Giles[a]

[a]*National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 4770 Buford Highway, N.E., MS K–45, Atlanta, GA 30341-3717, USA*
[b]*Department of Preventive Medicine, Southern California Permanente Medical Group, San Diego, CA, USA*

Received 21 March 2001; received in revised form 4 June 2001; accepted 14 June 2001

Abstract

Objective: This study is a detailed examination of the association between parental alcohol abuse (mother only, father only, or both parents) and multiple forms of childhood abuse, neglect, and other household dysfunction, known as adverse childhood experiences (ACEs).
Method: A questionnaire about ACEs including child abuse, neglect, household dysfunction, and exposure to parental alcohol abuse was completed by 8629 adult HMO members to retrospectively assess the relationship of growing up with parental alcohol abuse to 10 ACEs and multiple ACEs (ACE score).
Results: Compared to persons who grew up with no parental alcohol abuse, the adjusted odds ratio for each category of ACE was approximately 2 to 13 times higher if either the mother, father, or both parents abused alcohol ($p < 0.05$). For example, the likelihood of having a battered mother was increased 13-fold for men who grew up with both parents who abused alcohol (OR, 12.7; 95% CI: 8.4–19.1). For almost every ACE, those who grew up with *both* an alcohol-abusing mother and father had the highest likelihood of ACEs. The mean number of ACEs for persons with no parental alcohol abuse, father only, mother only, or both parents was 1.4, 2.6, 3.2, and 3.8, respectively ($p < .001$).
Conclusion: Although the retrospective reporting of these experiences cannot establish a causal association with certainty, exposure to parental alcohol abuse is highly associated with experiencing

☆ The Adverse Childhood Experiences Study was supported under a cooperative agreement #TS–44-10/11 from the Centers for Disease Control and Prevention through the Association of Teachers of Preventive Medicine, and is currently funded by a grant from the Garfield Memorial Fund. Mrs. Dube was supported by cooperative agreement #TS–44-10/11 from the Centers for Disease Control and Prevention through the Association of Teachers of Preventive Medicine.

* Corresponding author.

PII: S0145-2134(01)00293-9

adverse childhood experiences. Improved coordination of adult and pediatric health care along with related social and substance abuse services may lead to earlier recognition, treatment, and prevention of both adult alcohol abuse and adverse childhood experiences, reducing the negative sequelae of ACEs in adolescents and adults.

Keywords: Child abuse; Child neglect; Domestic violence; Parental alcohol abuse

Introduction

It is generally known that family environments are usually disrupted by parental alcohol abuse. Children of alcoholics are at increased risk for various childhood stressors such as abuse, neglect, witnessing domestic violence, or growing up with other forms of household dysfunction (Sher, Gershuny, Peterson, & Raskin, 1997; Sher, Walitzer, Wood, & Brent, 1991; Windle, Windle, Scheidt, & Miller, 1995; US Department of Health and Human Services [HHS], 1997). It has been estimated that 30% of child abuse cases involved alcoholic parents, and 60% of domestic violence cases have occurred when the perpetrator was under the influence of alcohol (Collins & Messerschmidt, 1993; HHS, 1997).

Few studies have considered *multiple, co-occurring* forms of childhood maltreatment or household dysfunction with parental alcoholism (Sher et al., 1997). Previous reports from the Adverse Childhood Experiences (ACE) Study have shown that ACEs rarely occur alone, rather, they are a complex set of highly inter-related experiences (Felitti, Anda, Nordenberb, Williamson, Spitz, Edwards, Koss, & Marks, 1998; Anda, Croft, Felitti, Nordenberg, Giles, & Williamson, 1999). In fact, where *multiple* ACEs (ACE score) were considered, strong graded relationships to several health-related problems such as smoking, sexually transmitted diseases, adult alcohol problems, and unintended pregnancies have been reported (Anda et al., 1999; Dietz, Spitz, Anda, Williamson, McMahon, Santelli, Nordenberg, Felitti, & Kendrick, 1999; Dube, Anda, Felitti, Edwards, & Croft, in press; Felitti et al., 1998; Hillis, Anda, Felitti, Nordenberg, & Marchbanks, 2000). Furthermore, previous research has largely ignored the co-occurrence of alcoholism in both parents or has focused only on paternal alcoholism (Sher et al., 1997; Zeitlen, 1994). Justification for this may be the higher prevalence of alcoholism in men (HHS, 1997), however, because women tend to be the primary caretaker for their children, examining the associations between maternal as well as bi-parental alcohol abuse with ACEs may be critical.

Thus, the purpose of the current study is to expand on the existing body of literature by describing the relationship between reports of parental alcohol abuses (neither parent, mother only, father only, or both parents) and the likelihood of other forms of ACEs. Specifically, we quantify the strength of the associations between parental alcohol abuse and being exposed to childhood abuse, neglect, household substance abuse, criminality of household members, mental illness among household members, and parental discord. In addition, we examine the association of parental alcohol abuse to experiencing *multiple, co-occurring* ACEs. We assess the strength of these inter-relationships to: (1) better understand factors that may contribute to negative long-term effects of growing up with alcohol abusing parents (Beichtman, Zucker, Hood, DaCosta, Akman, & Cassavia, 1992; Briere & Runtz, 1988;

Heath & Martin, 1994; Jaffe, Wolfe, Wilson, & Zak, 1986; Johnson & Leff, 1999; Sher et al., 1991); and (2) provide documentation of the complex burden of problems that frequently exist in families with alcohol abusing parents.

Methods

The ACE Study is a collaboration between the Kaiser Health Plan's Health Appraisal Center in San Diego, California, the Centers for Disease Control and Prevention (CDC), and Emory University. The overall objective is to assess the impact of numerous, inter-related, adverse childhood experiences on a wide variety of health behaviors and outcomes and on health care utilization (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.

Study population

The study population was drawn from the Health Appraisal Center (HAC), which was created to provide complete and standardized medical, psychosocial, and preventive health evaluations to adult members of Kaiser Health Plan in San Diego County. In any 4-year period, 81% of the adult membership will obtain this complete health assessment and over 50,000 members are evaluated each year. Thus, the purpose of a visit to the HAC is primarily for complete health assessments, rather than symptom- or illness-based care. Every person evaluated at the HAC completes a standardized questionnaire, which includes detailed health histories, as well as health-related behaviors, a medical review of systems and psychosocial evaluations. All of this standardized information was abstracted for each person and is included in the ACE Study database.

ACE Study design and questionnaire

The baseline data collection was divided into two survey waves that used the same methodology described by Felitti et al. (1998). Two weeks after the completion of their HAC evaluation, every individual who attended the clinic during the survey time periods was mailed an ACE Study questionnaire. The ACE questionnaire included detailed information about adverse childhood experiences (i.e., abuse and neglect), family and household dysfunction (i.e., domestic violence and substance abuse by parents or other household members), as well as additional information about health-related behaviors from adolescence to adulthood.

Prior publications from the ACE Study included respondents to the Wave I survey (9,508/13,494; 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, Anda, Nordenberg, Felitti, Williamson, & Wright, 2001; Felitti et al., 1998). The Wave II survey was conducted between June and October of 1997; 8,667 of 13,330 persons (65%)

responded. Thus, there was an overall response rate of 68% (18,175/26,824). The Wave II ACE Study questionnaire contained some additional questions (emotional and physical neglect) 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).

Assessment of representativeness, and response or reporting bias

In Wave I, the HAC questionnaire data were abstracted for both respondents *and nonrespondents* to the ACE Study questionnaire; this enabled a detailed assessment of the representativeness of the study population in terms of demographic characteristics and health-related issues. Results of this analysis have been published elsewhere (Edwards et al., 2001). Briefly, as with most survey research, nonrespondents tended to be younger, less educated, or from racial/ethnic minority groups. However, after controlling for demographic differences, the probabilities of health behaviors such as smoking, alcohol or drug abuse, and health conditions such as heart disease, hypertension, obesity, and chronic lung disease *did not differ* between respondents and nonrespondents. Thus, there was no evidence of any difference in the health behaviors or health status of respondents and nonrespondents (Edwards et al., 2001).

In addition, the HAC questionnaire included items about childhood sexual abuse; assessment of the strength of the relationship between childhood sexual abuse and numerous health behaviors, diseases, and psychosocial problems showed virtually identical results for respondents and nonrespondents. Thus, there was no evidence that respondents were more likely than nonrespondents to attribute health or social problems to negative childhood experiences (Edwards et al., 2001).

Exclusions from the study cohort

Data from Wave II only was analyzed. We excluded 3 respondents with missing information about race and 35 with missing information about educational attainment. Thus, the final study cohort included 99% of the respondents (8,629/8,667).

Definition of a history of growing up with parental alcohol abuse

We asked whether the respondent, during his or her childhood, lived with a problem drinker or alcoholic (Shoenborn, 1995). Participants could check as many as applied; possible choices were: father, mother, brother, sister, other relative, other nonrelative. An affirmative response to mother only indicated maternal alcohol abuse; father only indicated paternal alcohol abuse. Respondents who checked mother *and* father were classified as having grown up with bi-parental alcohol abuse. We grouped respondents who chose either mother or father as having grown up with at least one parent who abused alcohol in order assess the associations with experiencing *multiple* ACEs (ACE score).

Definition 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.* Questions used to define emotional and physical neglect were adapted from the Childhood Trauma Questionnaire (CTQ; Bernstein, Fink, Handelsman, Foote, Lovejoy, Wenzel, Sapereto, & Ruggiero, 1994); the response categories were *never true, rarely true, sometimes true, often true,* and *very often true,* and were scored on a Likert scale (1–5), respectively. Some items from the CTQ were reverse-scored based on the context of the question (Bernstein et al., 1994).

Verbal abuse. Verbal abuse was determined from answers to two questions from the CTS: (1) "How often did a parent, step-parent, or adult living in your home swear at you, insult you, or put you down?" and (2) "How often did a parent, step-parent, or adult living in your home act in a way that made you afraid you might be physically hurt?"

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 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, step-parent, 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.

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.

Emotional neglect. Five items from the CTQ were used to measure emotional neglect: (1) "There was someone in my family who helped me feel important or special." (2) "I felt loved." (3) "People in my family looked out for each other." (4) "People in my family felt close to each other." (5) "My family was a source of strength and support." To determine the CTQ clinical scales, responses all were reverse scored and summed for each respondent. A respondent with a score of ≥ 15 (moderate to extreme) from the CTQ was defined as having experienced emotional neglect.

Physical neglect. Five items from the CTQ were used to describe physical neglect: (1) "I didn't have enough to eat." (2) "I knew there was someone there to take care of me and

protect me." (3) "My parents were too drunk or too high to take care of me." (4) "I had to wear dirty clothes." (5) "There was someone to take me to the doctor if I needed it." These items were scored and summed for each respondent. Questions 2 and 5 were reverse-scored. A respondent with a score of $\geq$ 10 (moderate to extreme) from the CTQ was defined as having experienced physical neglect.

Battered mother. We used four questions from the CTS to define childhood exposure to a battered mother. The questions were preceded by the following statement: "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 for 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 questions 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 asked whether the respondent, during his or her childhood, lived with a problem drinker or alcoholic (Shoenborn, 1995), or anyone who used street drugs. An affirmative response to living with a brother, sister, other relative, or other nonrelative who was a problem drinker or alcoholic, or anyone who used street drugs indicated childhood exposure to substance abuse in the household.

Mental illness in household. A respondent who said that during his or her childhood someone in the household was depressed or mentally ill or had attempted suicide was defined as being exposed to mental illness.

Parental separation or divorce. This was defined as an affirmative response to the question "Were your parents ever separated or divorced?"

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

Statistical analysis

Adjusted odds ratios (OR) and 95% confidence intervals (CI) were obtained from multivariate logistic regression models that assessed the associations between parental alcohol abuse to each of the 10 categories of adverse childhood experience separately. Multiple ACEs (ACE score) were calculated by summing the number of ACEs reported for each individual. Adjusted mean ACE scores by parental alcohol abuse were obtained using a multivariate linear regression analysis. 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).

Persons with incomplete information about an adverse childhood experience ($n = 516$; 6% of respondents) were considered not to have had that experience. This exclusion would likely result in conservative estimates of the relationships between parental alcohol abuse and ACEs because persons who had potentially been exposed to an experience would always be misclassified as unexposed. This type of misclassification would potentially bias our results toward the null (Rothman, 1986). However, to assess this potential effect, we repeated our analyses after excluding any respondent with missing information on any one of the ACEs and found no differences in the final results.

Results

Characteristics of the study population

The study population included 4674 (54%) women and 3955 (46%) men. The mean age ($\pm SD$) was 55 years (± 15.5) for women and 57 years (± 14.5) for men. Seventy-three percent of women and 75% of men were White; 32% of women and 42% of men were college graduates; another 42% of women and 39% of men had some college education. Only 8% of women and 7% of men had not graduated from high school.

Overall, 22% of respondents reported that at least one of their parents was an alcoholic (24% of women and 20% of men). The likelihood of having grown up with an alcoholic father was substantially higher than having grown up with an alcoholic mother: 18% versus 2% for women, 15% versus 2% for men, respectively (Table 1). The prevalence of having grown up with both alcoholic parents was 4% for women and 3% for men. For the 10 categories of ACEs, the prevalence of each category was higher for women than for men except for physical abuse and physical neglect (Table 1). Over 17% of women and 11% of men reported 4 or more of these adverse childhood experiences (Table 2).

Parental alcohol abuse and the likelihood of adverse childhood experiences

We found strong relationships between parental alcohol abuse and each of the 10 ACEs. The association to each ACE was highest among respondents who grew up with two alcohol-abusing parents compared with persons with no alcohol-abusing parents; the exception was for men who experienced sexual abuse, parental divorce, and growing up with an incarcerated household member, and for women who experienced household mental illness (Table 3). For each category of ACE, the presence of an alcoholic parent doubled the risk of that ACE among both men and women. In addition, for both men and women, the *prevalence* of reporting any category of ACE was 2- to 3-fold higher if the mother abused alcohol compared to no parental alcohol abuse (Table 3). Of all of the ACEs, the association was strongest between any type of parental alcohol abuse and having a battered mother (Table 3).

The co-occurrence of ACEs was highest if respondents grew up with bi-parental alcohol abuse. The adjusted mean number of ACEs (total = 10) for persons with no alcoholic parents, father only, mother only, or both parents as alcoholics was 1.4, 2.6, 3.2, and 3.8, respectively ($p < .001$ for all comparisons to persons with no alcoholic parents). The

Table 1
Prevalence of parental alcohol abuse and adverse childhood experiences by gender

	Prevalence (%)		
	Women (n = 4,674)	Men (n = 3,955)	Total (n = 8,629)
Parental alcohol abuse			
Neither parent	75.7	80.4	77.9
Father only	18.1	14.8	16.6
Mother only	2.4	2.0	2.2
Both parents	3.8	2.8	3.3
Adverse childhood experiences			
Abuse			
Emotional Abuse	12.2	7.8	10.2
Physical abuse	25.1	27.9	26.4
Sexual abuse	24.3	17.1	21.0
Neglect			
Physical neglect	9.2	10.7	9.9
Emotional neglect	16.7	12.5	14.8
Household Dysfunction			
Battered mother	13.9	12.1	13.0
Parental separation or divorce	25.4	22.6	24.1
Mental illness in household	25.3	14.3	20.3
Household substance abuse	13.5	11.2	12.4
Incarcerated household member	6.8	5.0	6.0

Note: The authors cannot be certain whether the prevalences of these experiences apply to the general population of San Diego County.

relationship of parental alcohol abuse to mean ACE score did not differ between men and women. The distribution of multiple ACEs increased dramatically if either parent was an alcoholic (Fig. 1). The prevalence of zero ACEs was higher among those respondents who grew up with no alcoholic parents (42%), whereas the prevalence of four or more ACEs (34%) was higher among persons who grew up with at least one alcoholic parent. Hence, the distribution of ACE scores varied markedly based on parental alcohol abuse.

Table 2
Prevalence of the number of adverse childhood experiences (ACE score) by gender

ACE Score[a]	Prevalence (%)		
	Women (n = 4,674)	Men (n = 3,955)	Total (n = 8,629)
0	34.8	37.7	36.1
1	24.3	27.6	25.8
2	14.3	15.2	14.7
3	9.5	8.2	8.9
≥4	17.1	11.4	14.5

[a] The sum of 10 ACEs; the prevalences are not adjusted for any other variables.

Table 3
Prevalence and adjusted odds ratio for each adverse childhood experience by history of parental alcohol abuse stratified by gender

Category of ACE (dependent variable)	Parental alcohol abuse	Women		Men	
		(%)	Adjusted odds ratio[a]	(%)	Adjusted odds ratio[a]
Emotional abuse	Neither parent	9.0	1.0 (Referent)	5.9	1.0 (Referent)
	Father only	20.2	2.3 (1.9–2.9)	14.7	2.5 (1.9–3.3)
	Mother only	21.9	2.4 (1.5–3.8)	11.4	1.8 (0.9–3.7)
	Both parents	30.5	3.7 (2.6–5.3)	21.6	3.9 (2.4–6.3)
Physical abuse	Neither parent	20.8	1.0 (Referent)	24.7	1.0 (Referent)
	Father only	35.3	1.9 (1.6–2.3)	38.6	1.8 (1.5–3.3)
	Mother only	43.8	2.6 (1.8–3.9)	43.0	2.1 (1.3–3.3)
	Both parents	49.1	3.3 (2.4–4.5)	52.2	3.1 (2.1–4.6)
Sexual abuse	Neither parent	20.2	1.0 (Referent)	15.8	1.0 (Referent)
	Father only	35.1	2.0 (1.7–2.4)	21.7	1.5 (1.2–1.8)
	Mother only	35.1	1.8 (1.2–2.7)	29.1	2.2 (1.3–3.6)
	Both parents	47.5	3.1 (2.2–4.2)	19.8	1.3 (0.8–2.2)
Emotional neglect	Neither parent	13.2	1.0 (Referent)	10.0	1.0 (Referent)
	Father only	25.6	2.1 (1.7–2.5)	19.0	2.0 (1.5–2.2)
	Mother only	25.4	2.0 (1.3–3.1)	32.9	4.4 (2.7–7.2)
	Both parents	39.0	3.7 (2.7–5.1)	34.2	4.6 (3.0–7.9)
Physical neglect	Neither parent	6.6	1.0 (Referent)	8.5	1.0 (Referent)
	Father only	14.7	2.4 (1.9–3.0)	17.9	2.5 (1.9–3.2)
	Mother only	20.2	3.9 (2.4–6.4)	21.5	3.7 (2.1–6.5)
	Both parents	27.7	6.0 (4.2–8.8)	28.8	5.8 (3.7–9.1)
Battered mother	Neither parent	7.6	1.0 (Referent)	7.2	1.0 (Referent)
	Father only	31.2	5.2 (4.3–6.3)	29.7	5.3 (4.3–6.7)
	Mother only	29.8	5.0 (3.3–7.7)	29.1	5.4 (3.3–9.1)
	Both parents	45.2	9.8 (7.1–13.7)	46.8	12.7 (8.4–19.1)
Household substance abuse	Neither parent	8.8	1.0 (Referent)	7.5	1.0 (Referent)
	Father only	23.1	2.8 (2.2–3.4)	23.1	3.3 (2.6–4.2)
	Mother only	34.2	4.6 (3.0–7.1)	27.8	4.1 (2.4–7.0)
	Both parents	48.0	8.3 (5.9–11.5)	40.5	8.0 (5.3–12.1)
Household mental illness	Neither parent	20.8	1.0 (Referent)	11.5	1.0 (Referent)
	Father only	34.5	1.9 (1.6–2.2)	20.2	1.8 (1.5–2.3)
	Mother only	55.3	4.0 (2.7–5.9)	40.5	4.7 (2.9–7.5)
	Both parents	50.3	3.2 (2.4–4.4)	45.9	5.8 (3.9–8.6)
Parental separation or divorce	Neither parent	19.7	1.0 (Referent)	19.0	1.0 (Referent)
	Father only	39.6	2.4 (2.0–2.8)	33.0	2.0 (1.6–2.4)
	Mother only	53.5	4.0 (2.7–5.9)	50.6	4.1 (2.6–6.4)
	Both parents	53.7	4.0 (2.9–5.4)	49.5	4.0 (2.7–5.9)
Incarcerated household member	Neither parent	5.4	1.0 (Referent)	3.9	1.0 (Referent)
	Father only	10.8	1.9 (1.5–2.5)	8.9	2.1 (1.5–3.0)
	Mother only	9.6	1.9 (1.0–3.6)	11.4	3.0 (1.4–6.2)
	Both parents	13.5	2.8 (1.8–4.5)	9.9	2.7 (1.4–5.3)

[a] $p < .05$ in a logistic model adjusting for age at survey, sex, race, and educational attainment.

Discussion

The present findings support and expand previous reports on the associations between parental alcohol abuse and childhood abuse, neglect, and household dysfunction. Compared

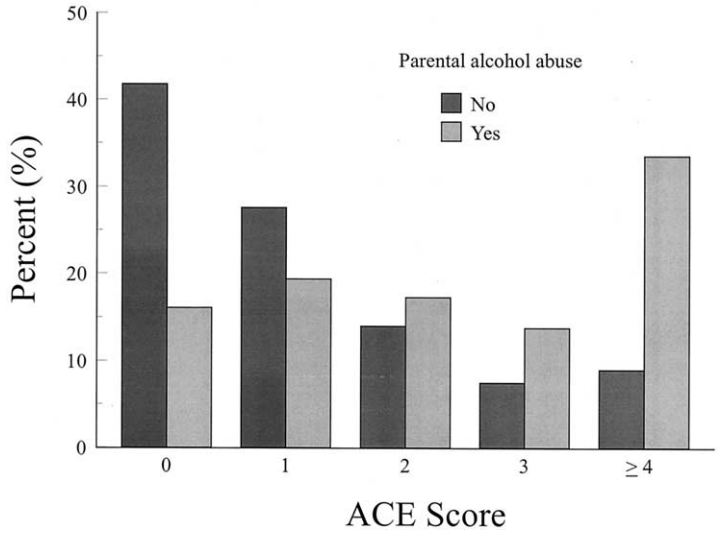

Fig. 1. Distribution of ACE score by a history of parental alcohol abuse. Prevalences are unadjusted.

to no parental alcohol abuse, maternal, paternal, or bi-parental alcohol abuse significantly increased the likelihood of experiencing any of the 10 adverse childhood experiences. Furthermore, the extremely high likelihood of domestic violence directed at the mother in families where both parents are abusing alcohol makes assessment of the danger of violence against the mother imperative. This is not only for the well-being of the mother, but also because of the powerful effect this has on children witnessing it (Perry & Pollard, 1998; Perry, Pollard, Blakely, Baker, & Vigilante, 1995).

The likelihood of enduring *multiple* ACEs, as demonstrated by having a high ACE score, is even greater among adults who reported that either or both parents abused alcohol. Thus, it is conceivable that children exposed to parental alcohol abuse are more likely to experience various forms of abuse, neglect, and household dysfunction. The co-occurrence of ACEs is important because the negative short- and long-term influence of ACEs on behaviors, emotional and social well-being, and physical health has repeatedly been shown to be *cumulative* (Anda et al., 1999; Dietz et al., 1999; Dube et al., in press; Felitti et al., 1998; Hillis et al., 2000).

Biological plausibility of the detriments of childhood stressors can be found through the neurosciences. Recent findings from the neurosciences suggest that early life experiences, whether negative or positive, contribute to the neurological development of children. Specifically, child abuse, neglect, and the other stressors that are more common in alcoholic households can adversely affect the developing brain in ways that result in emotional, social, and cognitive impairments, increasing the risk for substance abuse, depression, suicide, and a variety of other problems (DeBellis, Baum, Birmaher, Keshavan, Eccard, Boring, Jenkins, & Ryan, 1999; Green, Voeller, Gaines, & Kubie, 1981; Perry, Pollard, Blakely, Baker, & Vigilante, 1995; Van der Kolk & Fisler, 1994). It must be noted that in this study the exact age at which the exposures took place is unknown. Hence, further studies of when adverse experiences occur in childhood may help to clarify how the central nervous system is

affected by these exposures at various developmental stages (Perry & Pollard, 1998; Perry et al., 1995).

A potential weakness of the present study is the retrospective nature of the data reported. This may have resulted in under-reporting of parental alcohol abuse and ACEs. However, if both the exposure (parental alcohol abuse) and the outcome (ACEs) were under-reported, this would bias the results towards the null (Rothman, 1986). There are several reasons to believe that our estimates of the long-term relationship between adverse childhood experiences and adult health are conservative. Longitudinal follow-up of adults whose childhood abuse was well documented has shown that their retrospective reports of childhood abuse are likely to underestimate actual occurrence (Femina, Yeager, & Lewis, 1990; Williams, 1995). Underestimates of childhood exposures would result in downwardly biased estimates of the relationships between childhood exposures and adult health risk behaviors and diseases. Another potential source of underestimation of the strength of these relationships is related to the lower number of childhood exposures reported by older persons in our study. This could be an artifact caused by premature mortality in persons with multiple adverse childhood exposures; the clustering of multiple risk factors among persons with multiple childhood exposures is consistent with this hypothesis (Felitti et al., 1998). Thus, the true relationships between adverse childhood exposures and adult health risk behaviors, health status, and diseases may be even stronger than those we report. It is also possible there is differential recall, depending upon the nature and significance of the events (e.g., sexual abuse compared with emotional neglect).

Another potential limitation is the uncertainty of whether or not parental alcohol abuse or ACEs are truly the exposure and outcome, respectively. While strong associations were observed between different forms of parental alcoholism (maternal, paternal, or bi-parental) and ACEs, an understanding of the family dynamics cannot be detailed through a study such as this. The descriptive nature of this particular analysis should serve as a foundation to investigate further the high prevalence of child abuse, neglect, and household dysfunction with parental alcohol abuse. Nonetheless, the strong association observed between parental alcohol abuse and ACEs must not be overlooked because of these limitations.

Data on the levels of exposure from the ACE Study are nearly identical to other population-based studies. For example, in our study we found that 16% of the men and 25% of the women met the case definition for contact sexual abuse; a national telephone survey of adults in 1990 conducted by Finkelhor, Hotaling, Lewis, and Smith (Finkelhor, 1990), using similar criteria for sexual abuse, estimated that 16% of men and 27% of women had been sexually abused. Twenty-eight percent of the men from our study had been physically abused as boys, which closely parallels the percentage (31%) found in a recent population-based study of Ontario men that used questions from the same scales (MacMillan et al., 1997). In addition, 22% of participants reported having grown up with an alcohol abuser; the 1988 National Health Interview Survey estimated that 18.1% of adults had lived with an alcohol abuser during childhood (Shoenborn, 1995). The similar estimates of the prevalence of these childhood exposures between the ACE Study and other population-based studies suggest that our findings are likely to be applicable in other settings.

In summary, the children of parental alcohol abuse are far more likely to suffer multiple adverse experiences during childhood. Although these findings cannot definitively establish

a causal relationship between parental alcohol abuse and ACEs, there is a greater tendency for single as well as multiple ACEs to occur in households where either parent or both are manifesting alcohol problems. However, evidence for making causal inferences is provided by the strength of the relationships that we report and the dose-response relationship between exposure to alcohol-abusing parents and the number of ACEs. These findings, along with the known negative consequences of multiple ACEs, have practical implications for healthcare providers and persons who deliver social services. First, our work and the work of others shows a graded relationship between a history of childhood abuse or ACEs and a substantially increased risk for heavy drinking during adulthood (Bensley, Van Eenwyk, & Simmons, 2000; Dube et al., in press; Felitti et al., 1998). This may contribute to an intergenerational cycle of adult alcohol abuse and adverse childhood experiences. Practitioners who treat alcohol abusers should be aware that the families of these abusers need assessment for the chance that child abuse and neglect, domestic violence, and other forms of household dysfunction are co-occurring. Similarly, persons identifying and treating abused and neglected children must ensure that the children's parents are screened for alcohol abuse. They should also remain aware that ACEs tend to co-occur and determine if other adverse exposures are also present. Thus, a novel approach would be to unite what are traditionally considered categorically different health and social disciplines. This may remove the boundaries that allow only some of these adverse events to be identified and treated. An improved coordination of adult and pediatric health care and related social and substance abuse services may lead to earlier recognition, treatment, and prevention of parental alcohol abuse and adverse childhood experiences.

References

Anda, R. F., Croft, J. B., Felitti, V. J., Nordenberg, D., Giles, W. H., Williamson, D. F., & Giovino, G. A. (1999). Adverse childhood experiences and smoking during adolescence and adulthood. *Journal of the American Medical Association, 282,* 1652–1658.

Beichtman, J. H., Zucker, K. J., Hood, J. E., DaCosta, G. A., Akman, D., & Cassavia, E. (1992). A review of the long term effects of child sexual abuse. *Child Abuse & Neglect, 16,* 101–118.

Bensley, L. S., Van Eenwyk, J., & Simmons, K. W. (2000). Self-reported childhood sexual and physical abuse and adult HIV-risk behaviors and heavy drinking. *American Journal of Preventive Medicine, 18,* 151–158.

Bernstein, D. P., Fink, L., Handelsman, L., Foote, J., Lovejoy, M., Wenzel, K., Sapereto, E., & Ruggiero, J. (1994). Initial reliability and validity of a new retrospective measure of child abuse and neglect. *American Journal of Psychiatry, 151,* 1132–1136.

Briere, J., & Runtz, M. (1988). Symptomatology associated with childhood sexual victimization in a nonclinical adult sample. *Child Abuse & Neglect, 12,* 51–59.

Collins, J. J., & Messerschmidt, P. M. (1993). Epidemiology of alcohol-related violence. *Alcohol Health Research World, 17,* 93–100.

DeBellis, M. D., Baum, A. S., Birmaher, B., Keshavan, M. S., Eccard, C. H., Boring, A. M., Jenkins, F. J., & Ryan, N. D. (1999). A. E. Bennett Research Award. Developmental traumatology. Part I: biological stress systems. *Society of Biological Psychiatry, 45,* 1259–1270.

Dietz, P. M., Spitz, A. M., Anda, R. F., Williamson, D. F., McMahon, P. M., Santelli, J. S., Nordenberg, D. F., Felitti, V. J., & Kendrick, J. S. (1999). Unintended pregnancy among adult women exposed to abuse or household dysfunction during their childhood. *Journal of the American Medical Association, 282,* 1359–1364.

Dube, S. R., Anda, R. F., Felitti, V. J., Edwards, V. J., & Croft, J. B. (In press). Adverse childhood experiences and personal alcohol abuse as an adult. *Addictive Behaviors.*

Edwards, V. J., Anda, R. F., Nordenberg, D. F., Felitti, V. J., Williamson, D. F., & Wright, J. A. (2001). Factors affecting probability of response to a survey about childhood abuse. *Child Abuse & Neglect, 25,* 307–312.

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. *American Journal of Preventive Medicine, 14,* 245–258.

Femina, D. D., Yeager, C. A., & Lewis, D. O. (1990). Child abuse: adolescent records versus adult recall. *Child Abuse & Neglect, 14,* 227–231.

Finkelhor, D., Hotaling, G., Lewis, I. A., & Smith, C. (1990). Sexual abuse in a national survey of adult men and women: prevalence, characteristics, and risk factors. *Child Abuse & Neglect, 14,* 19–28.

Green, A. H., Voeller, K., Gaines, R. W., & Kubie, J. (1981). Neurological impairment in maltreated children. *Child Abuse & Neglect, 5,* 129–134.

Heath, A. C., & Martin, N. G. (1994). Genetic influences on alcohol consumption patterns and problem drinking: results from the Australian NH&MRC twin panel follow-up survey. *Annals of the New York Academy of Sciences, 708,* 72–85.

Hillis, S. D., Anda, R. F., Felitti, V. J., Nordenberg, D., & Marchbanks, P. (2000). Adverse childhood experiences and sexually transmitted diseases in men and women: a retrospective study. *Pediatrics, 106,* E11.

Jaffe, P., Wolfe, D., Wilson, S. K., & Zak, L. (1986). Family violence and child adjustment: a comparative analysis of girls' and boys' behavioral symptoms. *American Journal of Psychiatry, 143,* 74–76.

Johnson, J. L., & Leff, M. (1999). Children of substance abusers: overview of research findings. *Pediatrics, 103,* 1085–1099.

MacMillan, H. L., Fleming, J. E., Trocme, N., Boyle, M. H., Wong, M., Racine, Y. A., Beardslee, W. R., & Offord, D. R. (1997). Prevalence of child physical and sexual abuse in the community: results from the Ontario Health Supplement. *Journal of the American Medical Association, 278,* 131–135.

Perry, B. D., & Pollard, R. (1998). Homeostasis, stress, trauma, and adaptation—a neurodevelopmental view of childhood trauma. *Child and Adolescent Psychiatric Clinics of North America, 7,* 33–51.

Perry, B. D., Pollard, R. A., Blakely, T. L., Baker, W. L., & Vigilante, D. (1995). Childhood trauma, the neurobiology of adaptation and use-dependent development of the brain: how states become traits. *Infant Mental Health Journal, 16,* 271–291.

Rothman, K. J. (1986). *Modern epidemiology.* Boston, MA: Little, Brown.

Sher, K. J., Gershuny, B. S., Peterson, L., & Raskin, G. (1997). The role of childhood stressors in the intergenerational transmission of alcohol disorders. *Journal on the Studies of Alcohol, 106,* 414–427.

Sher, K. J., Walitzer, K. S., Wood, P. K., & Brent, E. E. (1991). Characteristics of children of alcoholics: putative risk factors, substance use and abuse and psychopathology. *Journal of Abnormal Psychology, 100,* 427–448.

Schoenborn, C. A. (1995). *Exposure to alcoholism in the family: United States, 1988.* Advance Data From Vital and Health Statistics, No, 205. National Center for Health Statistics. Hyattsville, MD: US Dept of Health and Human Services Publication No. (PHS) 95–1880.

Straus, M., & Gelles, R. J. (1990). *Physical violence in American families: risk factors and adaptations to violence in 8,145 families.* New Brunswick, NJ: Transaction Press.

US Department of Health and Human Services [HSS]. (1997). *Ninth Special Report to the US Congress on Alcohol and Health.* Rockville, MD: Author.

Van der Kolk, B. A., & Fisler, R. E. (1994). Childhood abuse and neglect and loss of self-regulation. *Bulletin of the Menninger Clinic, 58,* 145–168.

Williams, L. M. (1995). Recovered memories of abuse in women with documented child sexual victimization histories. *Journal of Traumatic Stress, 8,* 649–673.

Windle, M., Windle, R. C., Scheidt, D. M., & Miller, G. B. (1995). Physical and sexual abuse and associated mental disorders among alcoholic inpatients. *American Journal of Psychiatry, 152,* 1322–1328.

Wyatt, G. E. (1985). The sexual abuse of Afro-American and White American women in childhood. *Child Abuse & Neglect, 9,* 507–519.

Zeitlen, H. (1994). Children with alcohol misusing parents. *British Medical Journal, 50,* 139–151.

Résumé

Objectif: Cette étude consiste en un examen détaillé de la relation entre des parents qui boivent à l'excès (soit la mère ou les deux parents) et diverses manifestations de négligence et mauvais traitements des enfants et de dysfonction familiale, ces dernières étant nommées, expériences négatives de l'enfant (ENE).
Méthode: 8629 adultes desservis par des organismes de santé américains ont été interviewés sur leurs ENE, y compris les mauvais traitements et négligences en enfance, la dysfonction familiale et l'alcoolisme des parents. Le but était d'évaluer la relation entre dix ENE et une multiplicité d'ENE (score ENE) et le fait de grandir dans une famille de parents qui buvaient à l'excès.
Résultats: Lorsqu'on compare les personnes ayant grandi dans un foyer sans excès d'alcool, la probabilité de vivre un ou plusieurs ENE allait de 2 à 13 fois plus élevé si la mère, ou le père ou les deux parents buvaient à l'excès ($p < .05$). Par exemple, la probabilité que la mère soit une femme agressée augmente 13 fois lorsque l'homme a grandi dans un foyer où les deux parents buvaient à l'excès. Dans presque tous les types d'ENE, pour ceux qui grandissaient dans un foyer où le père et à la mère buvaient à l'excès la probabilité que les ÈNE soient présents étaient à sa plus élevée. Le nombre moyen d'ENE pour les personnes grandissant dans un foyer sans excès d'alcool, père seul, mère seule ou deux parents étaient respectivement de 1:4, 2:6, 3:2 et 3:8 ($p < 0001$).
Conclusions: Bien que les renseignements rétrospectifs de ces expériences ne représentent pas un lien causal définitif, on note un lien important entre un foyer de parents buvant à l'excès et les ENE. Il s'agira donc de mieux coordonner les services de santé aux adultes et les services pédiatriques, ainsi que les services ciblant les abus d'alcool et de drogues afin de reconnaître promptement les problèmes d'alcool et les ENE, les traiter et les prévenir. Ceci aidera à réduire les séquelles négatives des ENE chez les adolescents et les adultes.

Resumen

Objetivo: Este estudio es un examen detallado de la asociación entre abuso del alcohol parental (solo la madre, o ambos padres) y múltiples formas de abuso y negligencia contra los niños, y otra disfunción del hogar conocida como experiencias infantiles adversas (EIA).
Método: Ocho mil seiscientos veintinueve miembros adultos del HMO completaron un cuestionario acerca de experiencias infantiles adversas (EIA), incluyendo abuso y negligencia en la niñez, disfunción en el hogar y exposición al abuso en la ingesta de alcohol parental, para evaluar retrospectivamente la relación entre crecer con el abuso del alcohol parental a 10 EIA y múltiples EIA (tasa de EIA).
Resultados: En comparación con personas que crecieron sin abuso parental del alcohol, la proporción de la probabilidad para cada categoría de EIA fue aproximadamente de 2 a 13 veces más alta si la madre, el padre o ambos padres abusaban del alcohol ($p < .05$). Por ejemplo, la probabilidad de tener una madre maltratada aumentó 13 veces para los hombres que crecieron con ambos padres abusando del alcohol (o sea, 12.7; 95% Cl: 8.4–19.1). Para casi todos los EIA, aquellos que crecieron tanto con una madre y padre que abusaban del alcohol tenían la mayor probabilidad de sufrir EIA. La media en el número de EIAs para las personas sin abuso parental del alcohol, el padre solo, la madre sola, o ambos padres fue 1.4, 2.6, 3.2, y 3.8 respectivamente ($p < .001$).
Conclusiones: A pesar de que el reporte retrospectivo de estas experiencias no puede establecer con certeza una asociación causal, la exposición al abuso parental del alcohol está altamente asociada con las experiencias adversas en la niñez. El mejorar la coordinación del cuidado adulto y pediátrico junto con los servicios relacionados sociales y de abuso de sustancias puede llevar al reconocimiento temprano, el tratamiento, y la prevención de las secuelas negativas del EIA en adolescentes y adultos.