

Original article

## Adverse childhood experiences and the association with ever using alcohol and initiating alcohol use during adolescence

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### Abstract

**Purpose:** Alcohol is the most common and frequently used drug and has the potential to cause multiple deleterious effects throughout the lifespan. Because early age at initiation of alcohol use increases this potential and programs and laws are in place to attempt to delay the onset of alcohol use, we studied the relationship between multiple adverse childhood experiences (ACEs) and both the likelihood of ever drinking and the age at initiating alcohol use.

**Methods:** This was a retrospective cohort study of 8417 adult health maintenance organization (HMO) members in California who completed a survey about ACEs, which included childhood abuse and neglect, growing up with various forms of household dysfunction and alcohol use in adolescence and adulthood. The main outcomes measured were ever drinking and age at initiating alcohol use among ever-drinkers for four age categories:  $\leq 14$  years (early adolescence), 15 to 17 years (mid adolescence), and 18 to 20 years (late adolescence); age  $\geq 21$  years was the referent. The relationship between the total number of adverse childhood experiences (ACE score) and early initiation of alcohol use ( $\leq 14$  years) among four birth cohorts dating back to 1900 was also examined.

**Results:** Eighty-nine percent of the cohort reported ever drinking; all individual ACEs except physical neglect increased the risk of ever using alcohol ( $p < .05$ ). Among ever drinkers, initiating alcohol use by age 14 years was increased two- to threefold by individual ACEs ( $p < .05$ ). ACEs also accounted for a 20% to 70% increased likelihood of alcohol use initiated during mid adolescence (15–17 years). The total number of ACEs (ACE score) had a very strong graded relationship to initiating alcohol use during early adolescence and a robust but somewhat less strong relationship to initiation during mid adolescence. For each of the four birth cohorts, the ACE score had a strong, graded relationship to initiating alcohol use by age 14 years ( $p < .05$ ).

**Conclusions:** Adverse childhood experiences are strongly related to ever drinking alcohol and to alcohol initiation in early and mid adolescence, and the ACE score had a graded or “dose-response” relationship to these alcohol use behaviors. The persistent graded relationship between the ACE score and initiation of alcohol use by age 14 for four successive birth cohorts dating back to 1900 suggests that the stressful effects of ACEs transcend secular changes,

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including the increased availability of alcohol, alcohol advertising, and the recent campaigns and health education programs to prevent alcohol use. These findings strongly suggest that efforts to delay the age of onset of drinking must recognize the contribution of multiple traumatic and stressful events to alcohol-seeking behavior among children and adolescents. © 2006 Society for Adolescent Medicine. All rights reserved.

**Keywords:**

Alcohol use; Underage drinking; Child abuse; Family violence

Alcohol and its use have been a part of American culture dating back nearly 300 years to the emigration of Europeans to North America [1]. Early observations that frequent alcohol use coincided with health and social problems led to efforts to reduce the deleterious effects of alcohol consumption. As a result, the first liquor laws focused on taxes, license fees, and fines for drunken behavior [1]. The Temperance Movement of 1773 and Prohibition in the 1920s aimed to curb alcohol use, although their effectiveness remains questionable. In fact, Prohibition was largely a failure, and in retrospect may have made matters worse [1,2]. In the mid-1980s, the legal drinking age was increased from 18 to 21 years in some states, and this law has now been adopted by all states. Nonetheless, underage drinking continues, and in fact youth is often the norm for persons initiating alcohol use [3]. The success of society's efforts over the past 300 years to avoid problems associated with alcohol use is debatable because alcohol use continues to be pervasive within the United States.

Over the past century, advances in public health have made it possible to document the varied secular and social influences on the use of alcohol [4]. For example, the National Longitudinal Alcohol Epidemiologic Survey found that alcohol use in early adulthood (ages 20–24 years) was less than 50% for those born between 1894 and 1937 (pre-World War II), but this figure increased to 75% of persons born between 1968 and 1974 (Vietnam War era) [4]. Of particular concern is the trend toward initiation of alcohol use at earlier ages. Proposed explanations include increasing availability of alcohol both inside and outside of the home and exposure to marketing in the mass media [5]. In fact, recent data indicate that the age at initiating alcohol use has declined from 17.6 years in 1965 to 15.9 years in 2001 [6]. In the 2003 Youth Risk Behavior Survey, nearly 30% of high school students reported that they had their first drink before age 13 [7].

It is now well recognized that early initiation of alcohol use increases the risk of alcohol-related disorders later in life, such as alcohol dependence [8–10]. Studies have identified several predictors of early drinking such as the influence of peers [11,12], broken family structure [12], and poor quality of family relations [12]. Witnessing domestic violence [13] and experiencing physical, sexual, and emotional abuse [13,14] are associated with alcohol use among adolescents [13,14]. Although these studies provide evidence that domestic violence and childhood abuse are related to underage drinking, more information is needed to better

understand the relationship between multiple coexisting childhood stressors in the family environment and age at initiation of alcohol use.

The Adverse Childhood Experiences (ACE) Study is a large epidemiologic study among adult health maintenance organization (HMO) members that is designed to assess the impact of childhood stressors (i.e., abuse, neglect, and other forms of family dysfunction) on a wide range of health behaviors and outcomes in adolescence and adulthood [15]. To date, the ACE Study has repeatedly shown that traumatic and stressful childhood events increase the likelihood of myriad adolescent risk behaviors, such as early age at first intercourse [16], regular smoking by age 14 [17], attempted suicide during adolescence [18], use of illicit drugs during adolescence [19], male involvement in teen pregnancy [20], and adolescent pregnancy [21].

In this study, we examined the relationship between 10 adverse childhood experiences (ACEs) with both those who ever drank alcohol other than a few sips and initiation of alcohol use during early adolescence ( $\leq 14$  years), mid adolescence (15–17 years) and late adolescence (18–20 years). The ACEs included emotional, physical, and sexual abuse; emotional and physical neglect; witnessing domestic violence; parental separation or divorce; and living with substance abusing, mentally ill, or criminal household members. Because ACEs tend to co-occur, we used the total number of ACEs (ACE score) to assess the impact of multiple interrelated ACEs on age at alcohol initiation. We hypothesized that multiple ACEs would increase the likelihood of early initiation of alcohol use consistently in four birth cohorts dating back to 1900, despite the influence of social and secular trends on alcohol use over the past 100 years.

**Methods**

The ACE Study is an ongoing collaboration between the Kaiser Health Plan's Health Appraisal Center in San Diego, California, and the Centers for Disease Control and Prevention (CDC). The overall objective is to assess the impact of numerous interrelated ACEs on a wide variety of health behaviors and outcomes [15]. 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 Human Research Protection, Department of Health and Human Services (for-

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