



Symptoms of alcohol dependence and smoking initiation and persistence: A longitudinal study among US adults



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ABSTRACT

Background: A large number of adults report symptoms of, but do not meet diagnostic criteria for, an alcohol use disorder. Yet, little is known about the relationship between symptoms of alcohol use disorders and the initiation and persistence of smoking. This study prospectively examines the relationship between having 1–2 symptoms of alcohol dependence (without abuse) and smoking initiation and persistence as well as nicotine dependence over a 3-year period among adults in the United States.

Methods: Data were drawn from Wave 1 (2001–2002) and Wave 2 (2004–2005) of the National Epidemiologic Survey on Alcohol and Related Conditions. Relationships between Wave 1 symptoms of alcohol dependence, alcohol abuse, and alcohol dependence and initiation and persistence of cigarette smoking and nicotine dependence at Wave 2 were examined using logistic regression analyses. Analyses were adjusted for demographics, mood and anxiety disorders.

Results: Symptoms of alcohol dependence were associated with smoking initiation at Wave 2. There was no association between symptoms of alcohol dependence and smoking persistence. Symptoms of alcohol dependence predicted incident and persistent nicotine dependence. Findings persisted after adjusting for demographic characteristics and mood/anxiety disorders.

Conclusions: Even 1–2 symptoms of alcohol dependence are associated with increased vulnerability to smoking initiation and onset and persistence of nicotine dependence at a similar strength as alcohol use disorders. Efforts at smoking cessation must address problematic alcohol use, even at the subclinical level, in order to improve efficacy.

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1. Introduction

Despite the rise in anti-tobacco education campaigns and the proliferation of images portraying shocking visualizations of the negative effects of smoking in the media, smoking remains among the leading preventable causes of death worldwide (Centers for Disease Control and Prevention, 2008; Lim et al., 2012; Storr et al., 2010). It has been shown that quitting smoking may halt the progression of attendant pathology and in many cases, even lowers the risk of developing numerous unfavorable sequelae of smoking including heart disease, cancer, diabetes, and respiratory infections

(USDHHS, 2010). Most smokers have intentions to quit smoking (Centers for Disease Control and Prevention (CDCP), 2011), yet, evidence suggests that smoking cessation attempts are largely unsuccessful (CDCP, 2011; Fiore et al., 2008). As such, the development of more effective smoking cessation strategies is needed to improve quit rates. A better understanding of barriers to successful quitting will be useful in developing more effective smoking cessation interventions.

Among persons in the U.S. who are age 12 and older, past-month alcohol use is reported by half of persons (50.9%), while heavy alcohol use, defined as ≥ 5 drinks on an occasion in at least 5 out of the previous 30 days, is reported by 6.8% (Substance Abuse and Mental Health Services Administration (SAMHSA), 2010). With regard to alcohol use disorders, one-fifth of adults in the U.S. meet criteria for a lifetime diagnosis of an alcohol use disorder (Lasser et al., 2000) while nearly 10 million adults meet criteria for a past-year diagnosis of alcohol abuse and almost 8 million additional adults meet criteria for a past-year diagnosis of alcohol dependence (Grant

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et al., 2004a). Moreover, an extra 11.4% can be classified as having symptoms of alcohol dependence but not meeting criteria for alcohol abuse or dependence. The majority of people who consume alcohol smoke cigarettes (Falk et al., 2006). Conversely, the majority of smokers also consume alcohol (Harrison et al., 2008; Harrison and McKee, 2011; Husky et al., 2007; Mason and Leher, 2009; McKee et al., 2007; Weitzman and Chen, 2005). Findings from clinical studies have increasingly highlighted the overlap between various levels of alcohol use and smoking persistence (Schiller et al., 2012) because concurrent use of alcohol and tobacco significantly increases the relative risk of mortality from smoking-related diseases above either substance alone (Ansary-Moghaddam et al., 2009; Grucza et al., 2007; Hurt et al., 1996; Rosengren et al., 1988). Therefore, the relationship between alcohol use and smoking, and the shown negative impact of this relationship on disease and mortality, affects a large segment of the adult U.S. population.

Epidemiologic studies to date have focused almost exclusively on the relationship between smoking and alcohol use disorders (i.e., alcohol abuse and alcohol dependence; Falk et al., 2006). Yet, recent evidence suggests that: (1) there is a substantial proportion of the population with symptoms of alcohol use disorders who do not meet formal diagnostic criteria for alcohol abuse or alcohol dependence; (2) these symptoms persist over time; (3) these patterns of use are associated with increased risk of developing alcohol use disorders (Grabitz et al., 2012). The potential impact of the presence of alcohol use symptoms (not meeting diagnostic criteria for alcohol use disorders) on cigarette smoking initiation and persistence has not been empirically investigated. If 1–2 symptoms of alcohol use disorders (in the absence of a diagnosable alcohol use disorder) are associated with increased risk of smoking initiation and persistence, this has serious implications for improving/developing tobacco control programs.

The proposed study begins to fill our gap in knowledge about the relationship of alcohol dependence symptoms and smoking with three main objectives. First, we investigated the relationship between having 1–2 symptoms of alcohol dependence with smoking initiation and persistence compared to those who (a) consumed alcohol but reported no symptoms of alcohol use disorders; (b) met criteria for alcohol abuse; (c) met criteria for alcohol dependence. Second, we examined the relationship between having 1–2 symptoms of alcohol dependence with nicotine dependence onset and persistence 3 years later, compared to those who (a) consumed alcohol but reported no symptoms of alcohol use disorders; (b) met criteria for alcohol abuse; (c) met criteria for alcohol dependence. Third, we examined demographics and mood and anxiety disorders as potential confounders of these relationships.

2. Methods

2.1. Participants

The National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; Grant et al., 2009, 2004b) is a nationally representative longitudinal survey of the adult non-institutionalized, civilian population of the 50 United States conducted by the United States Census Bureau under the direction of the National Institute on Alcohol Abuse and Alcoholism (NIAAA). Wave 1 was conducted in 2001–2002 with a sample of 43,093 respondents age 18 and over (Grant et al., 2003b). Wave 2 was a 3-year prospective follow-up comprising 34,653 of the Wave 1 respondents, representing a response rate of 86.7% of eligible respondents (Grant and Kaplan, 2005). In combination with the Wave 1 response rate of 81%, the cumulative response rate for Wave 2 was 70.2%. Trained lay interviewers with at least 5 years experience conducted face-to-face assessments using computer-assisted software. Informed consent was obtained from all participants before beginning the interviews. Interviewers retested a random sample of both the Wave 1 and Wave 2 samples in order to assess the reliability of the survey (Grant et al., 2003b; Ruan et al., 2008). Detailed descriptions of the NESARC methodology, sampling, and weighting procedures have been reported elsewhere (Grant and Kaplan, 2005; Grant et al., 2003b). All of the analyses in the current study are based on adults who consumed at least one alcoholic beverage in the year prior to the Wave 1 interview and for whom all information was available in both waves ($n = 22,245$).

2.2. Interviewers, training, and field quality control

1800 professional interviewers from the Census Bureau conducted interviews using computer-assisted software with built-in skip, logic, and consistency checks. All interviewers had experience with other national health-related surveys with an average of 5 years of experience, and were further trained for 10 days under the direction of NIAAA. Verification of the interviewer was conducted by regional supervisors who re-contacted a random 10% of all respondents for quality control purposes. In addition, a randomly selected subset of respondents was re-interviewed with 1–3 complete sections of the Alcohol Use Disorder and Associated Disabilities Interview Schedule – DSM-IV (AUDADIS-IV; Grant et al., 2003b; Ruan et al., 2008). This evaluation served as a test–retest reliability study of NESARC measures (Grant et al., 2003a). In the few cases when accuracy was uncertain, the data were discarded and a supervising interviewer repeated the interview.

2.3. Measures

Psychological and substance use disorder diagnoses were assessed with the AUDADIS-IV. This instrument was specifically designed for experienced lay interviewers and was developed to advance measurement of substance use and mental disorders in large-scale surveys.

2.3.1. Alcohol dependence symptoms, alcohol abuse, and alcohol dependence. The AUDADIS-IV includes detailed assessment of DSM-IV criteria for alcohol use disorders (i.e., alcohol abuse, alcohol dependence). At least 1 of 4 criteria of alcohol abuse was required for a DSM-IV diagnosis of past-year alcohol abuse (i.e., 12 months preceding the interview). At least 3 of 7 criteria were required for a DSM-IV diagnosis of past-year alcohol dependence diagnosis. The reliability and validity of substance diagnoses and symptom items have been examined via test–retest reliability studies, clinical reappraisals conducted by psychiatrists, and other designs. These had excellent reliability in U.S. and international clinical and general population samples, with past-year alcohol diagnoses having a minimum kappa of 0.74 (Grant et al., 2003a). As such, the alcohol exposure variable was a categorical variable: 0–past-year drinkers who reported no abuse/dependence symptoms, 1–past-year drinkers who reported 1–2 symptoms of alcohol dependence and did not meet criteria for alcohol abuse or alcohol dependence, 2–past-year drinkers who met criteria for alcohol abuse, 3–past-year drinkers who met criteria for alcohol dependence.

2.3.2. Cigarette smoking and nicotine dependence. Smoking status at Wave 1 was defined as positive if the respondent reporting smoking at least 100 cigarettes in their lifetime and smoked cigarettes at any point in the year prior to the Wave 1 interview. Among non-smokers (past-year) at Wave 1, smoking initiation was considered positive if the respondent reported smoking cigarettes in the time between Waves 1 and 2. Among smokers (past-year) at Wave 1, smoking persistence was defined as positive if cigarette smoking was reported in the time since last interview at Wave 2.

Assessment of nicotine dependence was based on the unique characteristics of nicotine dependence as distinct from other substances. To that end, the AUDADIS-IV used an extensive list of over 40 questions to assess nicotine dependence, and obtains extensive information on time frames of nicotine use and dependence. Diagnoses were made according to the DSM-IV criteria (Schmitz et al., 2003). Nicotine dependence was assessed in the past-year at Wave 1. Incident nicotine dependence at Wave 2 (past-year) required the absence of nicotine dependence at Wave 1. Persistent nicotine dependence at Wave 2 (also past-year) required the presence of nicotine dependence at Wave 1.

The reliability and validity of the nicotine dependence diagnosis was assessed via a random subsample of 347 respondents who were re-interviewed with the nicotine dependence module up to 10-weeks after initial appraisal (Grant et al., 2003b). The reliability of the previous 12-month (i.e., current) diagnosis was good ($k = 0.63$). Further, a series of linear regression analyses were used to validate the diagnoses by examining the association between nicotine dependence and Short-Form-12v2 physical disability scores (an often used measure of generic quality of life which generates 10 component and profile scores assessing various dimensions of physical and mental disability; Grant et al., 2003a; Ruan et al., 2008).

2.3.3. Mood and anxiety disorders. In this study “any mood disorder” was comprised of meeting criteria for a diagnosis of one or more of the following disorders: major depression, dysthymia, mania, and hypomania. “Any anxiety disorder” encompassed meeting criteria for a diagnosis of one or more of the following disorders: panic with agoraphobia, panic without agoraphobia, social phobia, specific phobia, posttraumatic stress disorder and generalized anxiety disorder.

2.4. Analytic strategy

Initially, we conducted exploratory analyses through basic frequency distributions, contingency table analyses and graphical displays of associations between alcohol dependence symptoms, alcohol abuse, and alcohol dependence at Wave 1 with cigarette use and nicotine dependence in Wave 2 among current Wave 1 alcohol users (past-year use). We then ran a series of weighted logistic regression models to: (a) investigate the relationship between alcohol dependence symptoms, alcohol

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