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The relationship between nicotine cessation and mental disorders in a nationally representative sample

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ABSTRACT

The objective of this study was to examine the relationship between Axis I and II mental disorders, quality of life, and nicotine dependence cessation in a nationally representative sample. Data came from Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a nationally representative survey of adults in the United States ($N = 34,653$). People who met DSM-IV criteria for nicotine dependence previously but who had abstained from nicotine in the last year (nicotine cessation) were compared to people currently dependent on nicotine as well as lifetime abstainers using multivariate logistic regression. Outcomes of interest included DSM-IV Axis I and II mental disorders, treatment seeking for mental disorders, and quality of life measures. In adjusted models, individuals who ceased nicotine use in the last year were less likely to have past-year mood [adjusted odds ratio (AOR) = 0.64; 95% confidence interval (CI) 0.50–0.82, $p < 0.001$] and substance use disorders (AOR = 0.65, 95% CI 0.52–0.82, $p < 0.001$) compared to those with current nicotine dependence. They were also less likely to have narcissistic and borderline personality disorders. Compared to those with current nicotine dependence, cessation was associated with an improved quality of life, both physically (beta = 1.65; standard error 0.40, $p < 0.001$) and mentally (beta = 2.17, standard error 0.39, $p < 0.001$). In conclusion, nicotine dependence cessation was associated with reduced likelihood of several mental disorders and a higher quality of life compared to those with current nicotine dependence. These findings provide further support for public health policy aimed at smoking cessation.

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1. Introduction

Tobacco use is a major health issue in the United States. Responsible for almost half a million deaths annually, it is the leading cause of preventable death in the U.S. (Centers for Disease Control and Prevention, 2008). Over 70 million Americans are users of tobacco (Substance Abuse and Mental Health Services Administration, 2011), accounting for economic damage of over \$190 billion every year, of which \$96 billion is directly attributable to healthcare costs (Centers for Disease Control and Prevention, 2008). If current trends continue, one billion people may lose their lives during the 21st century as a result of tobacco use (World Health Organization, 2011).

While the deleterious physical health effects of smoking are common knowledge, its association with mental illness is increasingly recognized. Smoking rates in psychiatric outpatients

are higher than in the general population (Hughes et al., 1986); individuals with a mental illness are approximately twice as likely to smoke as those without a psychiatric diagnosis (Lasser et al., 2000). Several clinical and population-based studies have found an association between smoking or nicotine dependence and various mental illnesses, including mood disorders, anxiety disorders, substance use disorders, and schizophrenia (Breslau et al., 1991; Breslau et al., 1994; de Leon et al., 2002; Gonzalez-Pinto et al., 1998; Grant et al., 2004). Personality disorders have also been linked to nicotine dependence (Grant et al., 2004; Pulay et al., 2010; Trull et al., 2004; Trull et al., 2010; Zimmerman & Coryell, 1989; Zvolensky et al., 2011). The mechanism underlying these associations remains unclear. One hypothesis is that these mental disorders are primary in onset, with the development of secondary nicotine use as the individual attempts to self-medicate their symptoms (Glass, 1990; Hughes, 2008). Conversely, pre-existing nicotine use may lead to the development of secondary psychiatric disorders, implicating nicotine as a “psychological toxin” (Breslau et al., 2004; Hughes, 2008). Finally, a third explanation is that certain individuals are genetically or environmentally

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predisposed to both nicotine use and mental illness, making the use of tobacco a marker for potential mental illness (Hughes, 2008; Kendler et al., 1993).

Few studies have examined the association between nicotine cessation and psychiatric disorder comorbidity. Case reports and studies exist showing major depression or worsening depressive symptoms following tobacco cessation in those with and without prior depression (Covey et al., 1997; Glassman et al., 2001; Niaura et al., 1999; Stage et al., 1996). Further, the addition of antidepressant medication or mental health counseling to nicotine cessation programs may improve smoking abstinence rates (Brown et al., 2007; van der Meer et al., 2010). However, one smoking cessation study showed similar rates of major depressive episodes between individuals who remained abstinent from nicotine and those who did not (Tsoh et al., 2000). Other studies have reported no post-cessation increase in symptoms in individuals with psychosis (Baker et al., 2010) and no association between smoking cessation and worsening symptoms of major depression or posttraumatic stress disorder (McFall et al., 2005). Furthermore, Yaworski et al. (2011) found that the elevated risk of suicide attempt associated with nicotine dependence was attenuated when individuals ceased nicotine use. There is a paucity of research examining nicotine cessation and personality disorders. We are aware of only one population-based study, that of Zvolensky et al. (2011), that found an association between personality disorders and former nicotine dependence. They showed that former dependent smoking was associated with an increased likelihood of obsessive-compulsive and antisocial personality disorders, after accounting for the effects of mood and anxiety disorders. While that study examined people with a history of cigarette smoking, it did not specifically focus on the subgroup of people who have now ceased their use altogether.

Much of the existing literature is compromised by several limitations, including small sample sizes, selection bias, and lack of adjustment for confounders such as sociodemographic factors and comorbid mental illness. Importantly, there are no existing studies that have specifically examined the association between nicotine dependence cessation and mental disorders in the general population. The objective of this study was to examine the relationship between nicotine cessation and mental disorders in a large, nationally representative sample of American adults. By using a population-based sample that featured a comprehensive assessment of nicotine use and DSM-IV Axis I and II mental disorders, this study was positioned to address some of the gaps in existing literature. Furthermore, we sought to compare former nicotine-dependent people who had ceased using nicotine to currently dependent individuals. This is important as it provides an indirect method of assessing the temporal connection between nicotine dependence and mental disorders, which has previously been neglected. We hypothesized that people previously dependent on nicotine who had ceased using nicotine would be less likely to suffer from an Axis I or II disorder compared to those currently dependent. Secondary objectives included examining the association between nicotine dependence cessation, treatment utilization, and quality of life measures.

2. Methods

2.1. Data sources and sample

The present study used data from Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). The NESARC is a nationally representative American survey conducted by the National Institute of Alcohol Abuse and Alcoholism (NIAAA). Wave 2 of the survey was conducted between 2004 and

2005 and consisted of a total of 34,653 respondents, ranging in age from 20 to 99 years old, from the United States adult, non-institutionalized population. The cumulative response rate for Wave 2 was 70.2%. The U.S. Census Bureau and the U.S. Office of Management and Budget reviewed and approved the ethics protocol. The data from Wave 2 of the NESARC is representative of the U.S. civilian population based on region, age, race-ethnicity and sex for the 2000 Census (Ruan et al., 2008). Data were weighted to account for sampling biases and to ensure representativeness of the U.S. population. Further information about the NESARC sampling design and methodology is available elsewhere (Grant and Kaplan, 2005; Grant et al., 2009).

2.2. Measures

2.2.1. Sociodemographic variables

The sociodemographic variables included in the analyses were gender (male and female), income (\$0–\$19,999, \$20,000–\$34,999, \$35,000–\$59,999, and \$60,000+), ethnicity (White, Black, American Indian/Alaskan, Asian/Hawaiian, and Hispanic), age (20–29, 30–44, 45–64, and 65+), region of residence (Northwest, Midwest, South, and West), marital status (married/cohabitating, divorced/separated/widowed, and never married), education (less than high school, high school, and some college or higher), and urbanicity (urban, and rural).

2.2.2. Nicotine use

The Alcohol Use Disorders and Associated Disabilities Interview Schedule IV (AUDADIS-IV; Research Triangle Institute, 2009; Ware et al., 1996) was used to generate diagnoses of nicotine dependence and to quantify nicotine use. The diagnosis of nicotine dependence using this instrument was previously shown to have good reliability and validity (Grant et al., 2003). Three categories of nicotine use were defined in this study: 1) Nicotine Abstinence, 2) Nicotine Dependence, and 3) Nicotine Cessation. Nicotine abstinence included lifetime nicotine abstainers, who were defined as those who had never in their lives smoked 100 or more cigarettes, 50 or more cigars, used snuff or chewing tobacco over 20 times, or used a pipe more than 50 times, based on a prior definition (Yaworski et al., 2011). The nicotine dependence group included individuals who met DSM-IV criteria for nicotine dependence in the last 12 months. The nicotine cessation group was comprised of individuals who met DSM-IV criteria for nicotine dependence prior to the year before the survey, but had abstained from any nicotine use in the year before the survey. This period of nicotine dependence could have been at any point in their life, and thus their current period of abstinence could be longer than 1 year. All three groups of nicotine use were mutually exclusive.

2.2.3. Mental disorders

The AUDADIS-IV was used to make DSM-IV Axis I and II diagnoses (American Psychiatric Association, 2000) at Wave 2. Reliability and validity of this measure ranges from good to excellent depending on the diagnosis in question and has been described in detail elsewhere (Ruan et al., 2008). Axis I disorders were assessed both in lifetime and past-year timeframes, and included mood, (major depressive disorder, dysthymia, bipolar I disorder, and bipolar II disorder) anxiety (panic disorder, social phobia, post-traumatic stress disorder, specific phobia and generalized anxiety disorder) and substance use disorders (alcohol abuse or dependence, and drug abuse or dependence). Past-year diagnoses were used as outcome measures in this study in order to better assess temporal connections between nicotine use and mental disorders. Lifetime measures were used as covariates in analyses. The 'any psychotic disorder' variable was assessed through self-report,

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