Original article

The role of mental illness on cigarette dependence and successful quitting in a nationally representative, household-based sample of U.S. adults

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ABSTRACT

Purpose: To begin to explore whether the association between mental illness (MI), cigarette dependence, and unsuccessful quit attempts differs across particular demographic subgroups.
Methods: This study examines data from adults aged 18 years or older participating in the 2008–2012 National Surveys on Drug Use and Health. Analyses explored the moderating effects of age, gender, and race and/or ethnicity on associations between three levels of MI: (serious mental illness [SMI], any mental illness but no SMI, and no MI) and two smoking-related outcomes (cigarette dependence among current smokers and successful quitting among ever daily smokers).
Results: After confirming that adults with MI were more likely to be dependent on cigarettes and less likely to successfully quit smoking, particularly among those with SMI, adjusted analyses indicated that age (but not gender or race/ethnicity) moderated the associations between MI and cigarette dependence and between MI.
Conclusions: The magnitude of the association between MI and cigarette dependence and between MI and successful quitting appears to be stronger among older adults than among younger adults. Identifying subgroups at particular high risk of cigarette dependence is paramount to targeting smoking prevention, cessation, and treatment services appropriately.

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Introduction

Cigarette smoking continues to be one of the world's largest public health problems despite significant advances in the recognition of its adverse effects on health and well-being [1]. People with mental illness (MI) are at particular risk for cigarette-related negative health outcomes because they have higher rates of

having ever-smoked cigarettes [2–4], smoke more cigarettes per day [5,6], have higher rates of nicotine dependence [7–9], and suffer more smoking-related morbidity and mortality [10] than people without MI. These problems have made smoking prevention and cessation among those with MI—particularly serious MI (SMI)—a national priority [11]. Although the prevalence of smoking appears to be decreasing in the population overall [12], the prevalence is not decreasing as much among those with MI [13], and individuals with MI are less likely to successfully quit smoking than those without MI [2,4,6,14,15].

Research indicates that a substantial proportion of people with MI has a desire to quit smoking [16,17] and that smoking cessation interventions can be effective among those with MI [18,19]. This suggests that targeted interventions for cessation may be useful for reducing the smoking burden among those with MI. However, identifying where prevention and cessation programs may be optimally implemented is important, given limited resources.

Some evidence suggests that the relationship between smoking status and MI may not be the same across all subpopulations. For example, data from the 2007 Health Information National Trends Survey found that general psychological distress was related to current smoking for white but not for black or Hispanic respondents [20]. Whether these differences by race and/or ethnicity extend to the association between MI and cigarette dependence, however, is unknown. To our knowledge, no published studies have formally assessed the moderation of MI and cigarette dependence by other demographic characteristics such as gender or age that might influence the association between mental illness and cigarette dependence. Likewise, it is important to adjust for other sociodemographic covariates such as employment, education, and income which have been indicated as having significant associations with both mental illness and smoking outcomes [21].

Additionally, there is a paucity of research examining the interaction between MI and demographic characteristics on successful quitting. One prospective study of >4000 adults in the United States found that the relationship between depression symptoms and smoking cessation was not significantly moderated by gender or race. However, that study only included white and black respondents, and it did not examine age [22]. Moreover, the study focused only on depression symptoms and did not evaluate other mental illnesses.

This study builds on past work by using recent, nationally representative data from the National Survey on Drug Use and Health (NSDUH) to begin to explore whether the associations between MI and cigarette dependence, and MI and successful quitting are moderated by age, gender, and race and/or ethnicity in covariate adjusted models. This investigation is paramount because there is only limited evidence regarding the moderation of the association between MI and cigarette dependence and quitting, especially in population-based samples. Age, gender, and race and/or ethnicity were selected as the first three potential moderators for investigation because these characteristics are easily identified during a clinical encounter thereby making them potentially useful markers for targeting prevention and treatment efforts. Moreover, prior research has shown that rates of MI differ by age, gender, and race/ethnicity, as do rates of cigarette dependence and successful quitting [11,23,24], and there may be a differential relationship between MI and cigarette dependence or quitting, and age, gender, and race/ethnicity. NSDUH allows for a refined investigation of this moderation (e.g., examining six racial/ethnic groups and three levels of MI) because of its large sample size and national representativeness. Better understanding of these associations in specific subpopulations may help treatment and service providers identify those most at need for additional prevention and cessation services and may help future researchers identify etiological mechanisms.

Materials and methods

Sample

This secondary data analysis examines data from the 2008—2012 NSDUHs. NSDUH is an annual, cross-sectional survey of the civilian, noninstitutionalized U.S. population aged 12 years or older sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA), U.S. Department of Health and Human Services. The design comprises an independent multistage area probability sample for each of the 50 states and the District of Columbia. Approximately 68,000 interviews of adolescents and adults are completed annually; interviews are administered in households using face-to-face and audio computer-assisted self-interviewing methods. Respondents include residents of households and noninstitutional group quarters and civilians living on military bases. Respondents provide consent for participation after hearing a complete study description and are provided $30 on completion. NSDUH procedures were approved by the contracting organization's institutional review board. More information on NSDUH study design can be found in the 2008—2012 methodological resource books [25—29]. Data on having past-year MI in NSDUH are only available for adult respondents; therefore, all analyses were restricted to the approximately 230,000 respondents aged 18 years or older.

Measures

These analyses focus on cigarette smoking, rather than other forms of nicotine use and dependence such as cigars, pipes, and smokeless tobacco to reduce the heterogeneity in the analyses [30]. Three cigarette smoking—related outcomes are examined: nicotine (cigarette) dependence (henceforth referred to as "cigarette dependence") among all adults, cigarette dependence among past-month (cigarette) smokers (henceforth referred to as "current smokers"), and successful quitting among those who reported smoking at least 100 cigarettes in their lifetime and reported smoking daily at some point in their lifetime (henceforth referred to as "ever daily smokers"). Cigarette dependence among all adults and among current smokers was measured using the Nicotine Dependence Syndrome Scale (NDSS) [31] and the Fagerstrom Test of Nicotine Dependence [32], which are both widely used measures of the symptoms of physiological dependence (e.g., difficulty abstaining, withdrawal) and have good to excellent psychometric properties across diverse samples [32—34]. The NDSS is a multidimensional scale of nicotine dependence that includes 17 items scored on 5-point Likert scale. Dependence according to NDSS required a score of 2.75 or higher based on prior research that showed this score best differentiated chippers (nondependent smokers) and heavy (dependent) smokers. The Fagerstrom Test of Nicotine Dependence—defined dependence as smoking the first cigarette of the day within 30 minutes of waking, which prior research has shown to best discriminate dependent from nondependent smokers [35]. Respondents who met dependence criteria for either assessment were classified as cigarette dependent. For our analyses, successful quitting was defined as not smoking cigarettes in the past month among ever daily smokers.

Past-year MI in NSDUH is measured based on a statistical model developed from the Mental Health Surveillance Study (MHSS), which used trained clinical interviewers to administer the Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Nonpatient Edition [36]. These interviews were conducted via telephone on a subsample of just under 5700 adult respondents who had completed the main NSDUH interview from 2008 to 2012. In the MHSS clinical interview subsample, adults were defined as having past year any mental illness (AMI) if they were determined to have at least one of the past-year mental disorders assessed by the MHSS (bipolar I disorder, major depressive disorder, dysthymic disorder, posttraumatic stress disorder, panic disorder with and without agoraphobia, agoraphobia without history of panic disorder, social phobia, specific phobia, obsessive compulsive disorder, generalized anxiety disorder, anorexia nervosa, bulimia nervosa, adjustment disorder, or intermittent explosive disorder). Respondents with a past-year substance use disorder without another one of the aforementioned mental disorders were not classified as having past-year AMI. MHSS respondents determined to have past-year AMI were further classified as having SMI if their functional impairment score assessed by the Global Assessment of Functioning scale was indicative of serious functional impairment ($\leq$50).

These data, collected from the clinical subsample, were then used to create a predictive model for clinical classification with