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Depression among current, former, and never smokers from 2005 to 2013: The hidden role of disparities in depression in the ongoing tobacco epidemic

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ABSTRACT

Background: After declining sharply for many years, the prevalence of smoking has remained fairly stable over the past decade. One possible explanation is that there has been an increase in the prevalence of barriers to cessation, like depression, among remaining smokers.
Objectives: To estimate changes in the prevalence of depression among current, former and never smokers in the United States (U.S.) population from 2005 to 2013 overall and by age, gender, and income.
Methods: Data were drawn from the National Household Survey on Drug Use (NSDUH), an annual cross-sectional study of persons ages 12 and over (N = 496,805). The prevalence of past 12-month depression was examined annually among current (past 12-month), former (not past 12-month), and lifetime non-smokers from 2005 to 2013. Data were re-analyzed stratified by age, gender, and household income, and adjusted for demographics.
Results: Depression appears to have significantly increased in the United States from 2005 to 2013 among current, former, and never smokers. Depression prevalence increased among current smokers overall, but the increase among former and never smokers was even more prominent. Striking temporal changes emerged by age, gender and income. Specifically, (1) depression increased significantly among current smokers aged 12–17 (from 16% to 22%, p-value = 0.0002) and the prevalence was consistently more than twice as high as that of never smokers; (2) depression increased among male smokers (6.19%–7.82%, p-value = 0.0099); (3) depression increased significantly among smokers in the highest income group (6.36% to 8.91%, p-value = 0.0400). Throughout this period, the prevalence of depression among current smokers was consistently twice as high as among former and never smokers.
Discussion: Public health efforts aimed at decreasing the prevalence of smoking should take depression into account, a common and modifiable barrier whose treatment may help to increase successful smoking cessation. Future work is needed to disentangle the role of smoking and other factors that lead to increases in depression in the US population.

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1. Introduction

The prevalence of current cigarette smoking among adults in the United States (U.S.) has decreased substantially over the past several decades (US Department of Health and Human Services, 2014) from a high of 42% in 1965 to approximately 25.5% in 1990 (American Lung Association, 2007). Current estimates indicate that approximately 18% of Americans self-identify as current smokers (Jamal et al., 2014), suggesting a comparatively slowed decline in the past two decades. Some data suggest there have been increases in quit attempts in recent years among some subgroups of smokers (e.g., adults aged 25–64), but not others, and overall the rate of quitting has remained relatively stable (CDC, 2011). More recent data suggest that tobacco control efforts have not equally benefitted all persons with large and increasing inequalities in tobacco use observed among vulnerable subgroups (Williams et al., 2013). Persons with mental health problems are one such subgroup.

Major depression is among the most common mental health conditions, with a lifetime prevalence in the general population of approximately 20% (Hasin et al., 2005). Depression is more than twice as common in smokers than in non-smokers (Weinberger et al., 2016). Meta-analyses of clinical studies have suggested that depression is associated with poorer smoking cessation outcomes (Hitsman et al., 2013) and both community-based and epidemiologic studies have found that depression is associated with decreased likelihood of remaining abstinent over extended periods of time (Weinberger et al., 2016; Zvolensky et al., 2015).

As such, one possible explanation for the lack of improvement in quit rates over time in the U.S. population is that smokers today are more likely to have attributes or conditions, like depression, that make them less likely to quit in response to public health tobacco control efforts, compared with smokers a decade ago. If this is the case, we would expect the prevalence of depression to be higher among smokers in 2013 compared with smokers in 2005. Further, the prevalence of depression is more common overall among those of lower income, younger age, and female gender (Hasin et al., 2005). Yet, the prevalence of smoking has declined more rapidly among those of higher income, older age, and male gender (Hibbs et al., 2016). As such, understanding the changes in depression among smokers over time within these groups will be useful in providing a clearer understanding of what underlies and drives overall trends, as well as highlight high-risk groups who may benefit from tailored intervention and prevention programs. To our knowledge, no prior study has estimated changes in the prevalence of depression among current, former and never smokers in the U.S. over the past decade.

Against this background, the objective of this study is to investigate the relationship between depression and cigarette smoking in the U.S. population, to estimate changes in the prevalence of depression among current smokers in the United States from 2005 to 2013, and to examine the trends in depression among smokers by age, gender and income.

2. Methods

2.1. Study population

Study data were drawn from The National Survey on Drug Use and Health (NSDUH) public data portal (http://www.icpsr.umich.edu/), for years 2005–2013. The National Survey on Drug Use and Health (NSDUH) provides annual cross-sectional national data on the use of tobacco, other substance use, and mental health in the U.S., and is described in depth elsewhere (SAMHSA 2013). A multistage area probability sample for each of the 50 states and the District of Columbia has been conducted, to represent the male and female civilian non-institutionalized population of the U.S. aged 12 and older. The datasets from each year were concatenated, adding a variable for the survey year. For this study, analyses were restricted to participants who responded to past year depression questionnaires at the time of the interview. This results in a total study population of N = 496,805.

3. Measures

3.1. Past year depression

Depression modules were based on the fourth edition of the DSM-IV criteria for major depressive episode (MDE; APA 1994). MDE questions were adapted from the depression section of the National Comorbidity Survey-Replication (NCS-R; Hedden et al., 2012) for adults and of the National Comorbidity Survey-Adolescent (NCS-A) for adolescents. Separate depression modules were administrated to adults (aged 18 or older) and to adolescents (aged 12–17). Participants were classified as having had a lifetime MDE based on having 5+ out of 9 symptoms for MDE during the same 2-week period in their lifetime and at least one symptom has to be a depression mood or loss of interest or pleasure in daily activities. Respondents with lifetime MDE were further classified as having past year MDE if they met criteria for a lifetime MDE and if they felt depressed or lost interest or pleasure in daily activities a time period of 2 weeks or longer during the past 12 months, while also having some of the other symptoms (weight gain or lost, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or loss of energy, feeling of worthlessness, diminished ability to think or concentrate or indecisiveness, recurrent thoughts of death or recurrent suicide ideation) for lifetime MDE. Due to changes in the questionnaire in 2008, adjusted past year MDE variables for adults were developed to allow for comparison across years 2005–2008 and later years. The past year MDE variable was created by combining the youth and adults variables for this study.

3.2. Cigarette use

Cigarette use was assessed by the questions: “Have you ever smoked part or all of a cigarette?” Participants who answered “no” to this question were classified as lifetime never smokers. Those who responded “yes” were asked “How long has it been since you last smoked part or all of a cigarette?” Participants who responded “Within the past 30 days” or “More than 30 days ago but within the past 12 months” to this question were classified as current smokers. Participants who responded “More than 12 months ago but within the past 3 years” or “More than 3 years ago” to this question were classified as former smokers.

3.3. Demographic characteristics

Demographic variables were categorized as follows: age (12–17 years old as reference group, 18–25 years old, 26–34 years old, 35–49 years old, 50 years or older), gender (male as reference group, female), total annual family income variable in four categories was collapsed into three categories for analyses: (less than $20,000/year as reference group, $20,000–$74,000/year, $75,000 or more/year).

3.4. Statistical analysis

All analyses were performed incorporating the NSDUH sampling weights and controlling for the complex clustered sampling using SUDAAN Version 11 (http://www.rti.org/sudaan/). First, the prevalence of smoking status (current smokers, former smokers, and never smokers) was calculated with standard errors annually from 2005 to 2013. Time trends of smoking status were assessed using