Sleep apnea, psychopathology, and mental health care

Christopher N. Kaufmann, PhD, MHS [a,b,*], Ryoko Susukida, PhD [c], Colin A. Depp, PhD [a,b]

[a] Department of Psychiatry, UC San Diego, 9500 Gilman Drive, La Jolla, CA 92093, USA
[b] Stein Institute for Research on Aging, UC San Diego, 9500 Gilman Drive, La Jolla, CA 92093, USA
[c] Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, 624 North Broadway, Baltimore, MD 21205, USA

ARTICLE INFO

ABSTRACT

Objective: Sleep apnea has been shown to be associated with mental health conditions. This study examined the association between sleep apnea and psychopathology and mental health service utilization in a US nationally-representative sample.
Design: National Survey on Drug Use and Health (NSDUH).
Setting: United States.
Participants: We used data on 264,653 individuals who participated in the 2008-2014 waves of the NSDUH, of which 5498 (3.3%) reported having sleep apnea within the past year.
Intervention: Not applicable.
Measurements: Based on NSDUH responses, participants were categorized as having depression, suicidal ideation, anxiety, and serious psychological distress within the past year. Analyses consisted of using logistic regression models with sleep apnea as the main predictor and mental health conditions as the outcomes of interest, controlling for potential confounding variables.
Results: Compared with those without sleep apnea, those reporting past-year sleep apnea had 3.11 (95% confidence interval [CI], 2.77-3.50) times increased odds of having depression, 2.75 (95% CI, 2.34-3.23) times increased odds of suicidal ideation, 3.68 (95% CI, 3.30-4.10) times increased odds of anxiety, and 2.88 (95% CI, 2.61-3.17) times increased odds of severe psychological distress, after controlling for confounders. Among those with each psychiatric outcome, individuals with sleep apnea were substantially more likely to report unmet need for mental health care, despite reporting greater mental health service use.
Conclusions: Individuals with sleep apnea have increased risk for psychopathology, including suicidal ideation. Efforts to address the mental health care needs of those with sleep apnea are needed.

Introduction

Sleep apnea is highly prevalent, affecting 13% of men and 6% of women in the general adult population in the United States,[1] and is commonly comorbid with numerous chronic health conditions,[2] including hypertension,[3,4] chronic obstructive pulmonary disease,[5] and obesity[6] among others. Studies show these health conditions to be risk factors for, exacerbated by, and develop subsequent to the onset of sleep apnea.[7] As such, efforts to manage physical health conditions among those with sleep apnea have been a top priority for research, public health policy, and clinical practice.[8]

Studies show an association between sleep apnea and mental health conditions—with mood, anxiety, and posttraumatic stress disorder, being highly comorbid with sleep apnea—and there are reports of higher risk of sleep apnea in psychosis and schizophrenia as well.[9] There is also more recent evidence to suggest an association between sleep apnea and suicidal thinking and behaviors,[10,11] but these have been primarily limited to studies with smaller sample sizes and case reports. Although epidemiological studies have demonstrated links between sleep disturbances (eg, insomnia) and suicidal thinking and behavior,[12–14] suicidal ideation has not been fully examined specifically in patients with sleep apnea. Understanding the role of sleep apnea in suicidality in addition to other psychopathology in a nationally-representative sample may provide insights about their co-occurrence so as to inform population health.

Moreover, given the high prevalence of mental health conditions in sleep apnea, it is surprising that little research has examined the extent to which people with sleep apnea access mental health care (and their perceptions of whether it is addressing their needs). Although sleep apnea has been shown to be associated with elevated overall health service use[15,16] and costs,[17] more research is needed

* Corresponding author at: Department of Psychiatry, UC San Diego, 9500 Gilman Drive #0664, La Jolla, CA 92093, USA. Tel.: +1 858 534 0955 (Office).
E-mail address: cnkaufmann@ucsd.edu (C.N. Kaufmann).

to determine whether individuals with sleep apnea also have unmet needs for mental health care.

This study examined the association between sleep apnea and psychopathology (including depression, suicidal ideation, anxiety, and serious psychological distress) in a nationally-representative sample of US adults, and whether needs for mental health care were met. We hypothesized that compared with individuals without sleep apnea, those with sleep apnea would show substantially greater risk of concurrent psychopathology. In addition, we hypothesized that among those with the specific mental health conditions, individuals with sleep apnea would report greater use of mental health care services but also greater unmet need for care than the remaining sample.

Participants and methods

Data source

This study combined data from the 2008 to 2014 waves of the National Survey on Drug Use and Health (NSDUH).[18] The NSDUH is a cross-sectional national survey conducted annually by the Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. The NSDUH targets nationally representative noninstitutionalized individuals in the United States who are 12 years and older. The sample is randomly selected annually from 50 states and District of Columbia. The primary purpose of the NSDUH is to collect data to estimate state-level and national prevalence and patterns of substance use and mental health. The NSDUH data are collected by in-person interviews in study participants' homes, which last approximately an hour. The weighted NSDUH interview response rate across all years in our study ranged from 71.2% to 75.6%. Our study sample consisted of participants who were 18+ years old. Because only a small portion of observations had missing data (n = 6667; 2.5% of 271,320) for any one variable in our analysis, we conducted statistical analyses with complete cases (n = 264,653).

Measures

Sleep apnea

NSDUH participants were asked "Which, if any, of these conditions did a doctor or other medical professional tell you that you had in the past 12 months?" of which sleep apnea was listed as a condition. Individuals were categorized as having sleep apnea based on an affirmative response to this question.

Psychopathology

Depression. A diagnosis of major depressive episode (based on criteria in the *Diagnostic Statistical Manual of Mental Disorders*)[19] was obtained through use of structured diagnostic interview (adopted from the Composite International Diagnostic Interview administered in the National Comorbidity Survey Replication)[20] delivered by study staff. The Composite International Diagnostic Interview depression module has been shown to have high concordance with other validated measures of psychopathology.[21] Individuals were identified as having a major depressive episode if they met 5 of the following criteria within a past 12-month time interval: (i) depressed/irritated mood most of day within past 2 weeks, (ii) lower interest/pleasure derived from all activities, (iii) change in appetite and/or body weight, (iv) change in sleeping patterns, (v) change in activities or behaviors, (vi) low energy/fatigue, (vii) feelings of guilt or worthlessness, (viii) lower concentration, and (ix) repeated thought of death. *Suicidal ideation.* Suicidal ideation was assessed through a single question: "At any time in the past 12 months, that is from [datefill] up to and including today, did you

seriously think about trying to kill yourself?" with response options being yes or no. *Anxiety.* Participants were asked whether a doctor had told them they had an anxiety disorder (yes/no) within the past year. *Serious psychological distress.* Participants were categorized as having serious psychological distress based on a score of greater than or equal to 13 during the worst month of the past year on the K6 Kessler Psychological Distress Scale.[22] The K6 has been shown to have excellent internal consistency and reliability (area under the curve = 0.89).[23]

Mental health service use patterns

NSDUH participants were asked to report whether they received a variety of mental health services in the prior year. We categorized individuals as having received any mental health services and those who did not.

Unmet need for mental health care

NSDUH participants were identified as having unmet need for care by response to the following question: "During the past 12 months, was there any time when you needed mental health treatment or counseling for yourself but didn't get it?" with response options being "yes" or "no."

Other variables

NSDUH also asked respondents to indicate their sex, age (18-25, 26-34, 35-49, 50-64, and 65+ years), race/ethnicity (white, black, other, Hispanic), income (<$20,000, $20,000-$49,999, $50,000-$74,999, $75,000+), marital (married, widowed, divorced or separated, never married) and employment status (full-time, part-time, unemployed, out of labor force), education (<high school, high school graduate, some college, college graduate), and past-year alcohol or illicit drug abuse/dependence, based on *Diagnostic Statistical Manual of Mental Disorders* criteria. The details of assessment of past-year alcohol or illicit drug abuse/dependence are described in Appendix D ("Recoded Substance Dependence and Abuse Variable Documentation") in the NSDUH codebooks (NSDUH, 2008-2014).

Statistical analyses

We completed a 3-stage analysis. First, we pooled data from all survey years (ie, 2008-2014) to examine demographic characteristics comparing past-year sleep apnea to that of the remaining sample, and used Rao-Scott F-adjusted χ^2 statistics to assess differences across these groups. Second, we assessed the association between past-year sleep apnea and depression, suicidal ideation, anxiety, and serious psychological distress. Four separate logistic regression models were estimated, with each of the 4 conditions serving as the outcomes and past-year sleep apnea as the predictor of interest. These regression models also controlled for participant sex, age, race/ethnicity, income, marital status, employment status, education, and any illicit drug or alcohol abuse/dependence. To control for any temporal trends over the study period, we also controlled for survey year using dummy variables, with the 2008 year serving as the reference. Finally, to determine whether there were differences in mental health service use patterns between those with and without sleep apnea, we conducted logistic regression models with sleep apnea as the outcome and the mental health service use as the predictor. We also repeated these analyses with unmet need as the predictor. These analyses were limited to those with each mental health condition under consideration in this study, and adjusted for the same variables as in previous analysis stages. All analyses were conducted in Stata Version 13 SE (StataCorp, College Station, TX), and accounted for complex sampling design using survey design variables and population weights provided by NSDUH, by using the "svy" command.