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Gender differences in cannabis use disorders: Results from the National Epidemiologic Survey of Alcohol and Related Conditions

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ABSTRACT

Background: To examine gender differences among individuals diagnosed with DSM-IV lifetime cannabis use disorder (CUD).
Methods: A nationally representative sample of U.S. adults aged 18 years or older that were diagnosed with lifetime CUD ($n = 3297$): Men ($n = 2080$), Women ($n = 1217$). Data were drawn from the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC, $n = 43{,}093$). The survey response rate was 81%.
Results: Nearly all individuals with CUD had a psychiatric comorbidity (95.6% of men, 94.1% of women). Men with lifetime CUD were more likely than women to be diagnosed with any psychiatric disorder, any substance use disorder and antisocial personality disorder, whereas women with CUD had more mood and anxiety disorders. After adjusting for gender differences in sociodemographic correlates and the prevalence of psychiatric disorders in the general population, women with CUD were at greater risk for externalizing disorders. Men with CUD met more criteria for cannabis abuse, had longer episodes of CUD, smoked more joints, and were older at remission when compared to women with CUD. Women experienced telescoping to CUD. Treatment-seeking rates were very low for both genders, and there were no gender differences in types of services used or reasons for not seeking treatment.
Conclusions: There are important gender differences in the clinical characteristics and psychiatric comorbidities among individuals with CUD.

1. Introduction

Cannabis is the most widely used illicit substance in the world (Australian Institute of Health and Welfare, 2003; Copeland et al., 2001; Donnelly and Hall, 1994; European Monitoring Center for Drugs and Drug Addiction, 2003), and is the drug with the highest rate of abuse or dependence in the U.S. (Substance Abuse and Mental Health Services Administration, 2009). About 11.8% of men and 5.4% of women meet criteria for a lifetime cannabis use disorder (CUD; Stinson et al., 2006). CUD is associated with lower educational attainment (Gruber et al., 2003), increased violence (Arseneault et al., 2000), high healthcare costs (Pacula, 2005), and many other personal and societal consequences. Despite the increasing prevalence of CUD (Compton et al., 2004), the gender differences among individuals with this disorder remain poorly characterized. Most data available on gender differences in CUD is derived largely from clinical samples (Crowley et al., 1998; Stephens et al., 1993; Westermeyer and Boedicker, 2000), yielding results that may not extrapolate to the general population of individuals with CUD. Important questions remain regarding the gender differences in psychiatric comorbidities, clinical course, and treatment-seeking patterns among individuals with CUD.

First, gender differences between CUD and psychiatric comorbidities have been largely unexplored. Previous work has shown that 90% of individuals with lifetime cannabis dependence have comorbid psychiatric disorders (Agosti et al., 2002) and that women with CUD are more likely to meet criteria for major depression when compared to men with CUD (Grant, 1995). However, to our knowledge, gender differences in psychiatric comorbidity among individuals with CUD have otherwise not been described. Furthermore, no study has examined whether CUD moderates the relationship between gender and psychiatric comorbidity, and as a result, little information exists on whether CUD increases the risk of specific comorbidities across genders.

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Second, it is also unknown whether the clinical course of CUD varies between men and women. The first use of cannabis and highest risk of cannabis dependence occurs around late adolescence (Degenhardt et al., 2008; Wagner and Anthony, 2002), while use of cannabis tends to decline in the late 20s (Coffey et al., 2000; Kandel and Davies, 1992). Few epidemiological studies have examined whether there are any gender differences in these milestones, or in the severity of CUD. Few investigations have examined whether women have an accelerated progression from first use of cannabis to a CUD. This accelerated progression across the landmark stages of substance use disorders has been termed a "telescoping effect," and has been reported in clinical samples of individuals with alcohol dependence (Randall et al., 1999) and clinical (Ibanez et al., 2003; Tavares et al., 2003) and epidemiological (Blanco et al., 2006) samples of pathological gambling. To date, only two studies have investigated whether telescoping occurs in cannabis dependence (Ehlers et al., 2010; Hernandez-Avila et al., 2004). While both studies found evidence for the telescoping phenomenon for cannabis dependence, they both had relatively small samples.

Finally, little is known about the gender differences in treatment-seeking behaviors among individuals with CUD. The admission rate for cannabis problems has increased by 32% from 1996 to 2006 for the U.S. (Substance Abuse and Mental Health Services Administration, 2008). In addition, cannabis accounted for 16% of all treatment admissions in 2006, and was the most common illicit drug responsible for treatment admissions that year (Substance Abuse and Mental Health Services Administration, 2008). Despite this a reported increase in treatment admission rates, treatment-seeking for CUD appears to be low, and no data is available on reasons for not seeking treatment by gender.

Our study aims to extend prior investigations on the gender differences among men and women with CUD by drawing on a large, nationally representative epidemiologic study, the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; $n = 43{,}093$). The specific goals of this study are: (1) to compare the rates and patterns of psychiatric comorbidity among men and women with CUD; (2) to examine gender differences in the course and clinical presentation among men and women with CUD; and (3) to investigate gender differences in treatment seeking patterns among men and women with CUD.

2. Methods

2.1. Sample

The 2001–2002 NESARC is based on a U.S. representative sample that has been described in detail elsewhere (Grant et al., 2004). The target population was the civilian non-institutionalized U.S. population, included those residing in households and group quarters that were aged 18 years and older. Face-to-face interviews were conducted with 43,093 respondents by professional interviewers from the U.S. Census Bureau. The survey response rate was 81%. Blacks, Hispanics, and young adults (ages 18–24 years) were oversampled, and data were adjusted for oversampling and nonresponse. The weighted data were then adjusted to represent the U.S. civilian population based on the 2000 census (Grant et al., 2004, 2005, 2006). The sample for this study was composed of men ($n = 2080$) and women ($n = 1217$) with lifetime cannabis use disorders (i.e., cannabis abuse, dependence or both).

2.2. Measures

Sociodemographic measures included gender, race/ethnicity, nativity, age, education, personal income, employment status, marital status, place of residence, region of the country, and insurance type.

The diagnostic interview was the Alcohol Use Disorder and Associated Disabilities Interview Schedule–DSM-IV Version (AUDADIS-IV) (Grant et al., 2001, 2004). The AUDADIS-IV includes an extensive list of symptom questions that operationalize each DSM-IV criteria for cannabis abuse and dependence separately. Each criterion for DSM-IV cannabis abuse was rated independently of whether or not dependence was present, allowing the identification of cannabis-dependent individuals with and without abuse (Hasin et al., 2005b). The high reliability and validity of the AUDADIS substance use disorder diagnoses are well documented (Canino et al., 1999; Compton et al., 2004; Cottler et al., 1997; Chatterji et al., 1997; Grant, 1995; Hasin et al., 2003; Nelson et al., 1999).

Mood disorders included DSM-IV primary major depressive disorder (MDD), bipolar I, bipolar II, and dysthymia. Anxiety disorders included panic disorder, social anxiety disorder, specific phobias, and generalized anxiety disorder. Personality disorders included DSM-IV avoidant, dependent, obsessive-compulsive, paranoid, schizoid, and antisocial personality disorders. The test–retest reliability for AUDADIS-IV mood, anxiety, and personality diagnoses in the general population and in clinical settings was fair to good ($K = 0.40$–0.62; Hasin et al., 2003).

Measures of the clinical course of CUD included age at first use of cannabis, age of onset at heavy use (defined as daily use or use in more than 20 days/month), age at onset of the CUD, total number of episodes of the CUD, total number of diagnostic criteria met, duration of the longest episode, the percentage of individuals who remitted from the disorder, and the age at remission. The mean number of episodes of cannabis abuse, and the mean number of criteria met for cannabis abuse was assessed only among individuals with cannabis abuse whereas the mean number of episodes of cannabis dependence, and the mean number of criteria met for cannabis dependence was assessed among individuals with cannabis dependence with or without a diagnosis of cannabis abuse. Telescoping was assessed by measuring the time elapsed from age at first use to the age at onset of CUD.

Consistent with other reports (Kessler et al., 2005), we divided treatment-seeking into professional treatment and non-traditional treatment (treatment provided by human service professionals) among individuals who sought treatment. Professional treatment included: (1) outpatient visits to a physician, psychologist, or any other professional; (2) inpatient treatment in a drug detoxification or rehabilitation unit, or hospital ward; and (3) treatment in an emergency department. Human service professionals included members of the clergy, employee assistance programs, family and social services, halfway houses, therapeutic communities, crisis centers, and self-help groups.

Among individuals with CUD who did not seek treatment, we compiled reasons for not seeking help into four categories: (1) logistical barriers (e.g., financial difficulties, lack of time); (2) lack of motivation (e.g., wanted to keep using cannabis); (3) social stigma (e.g., was embarrassed by the problem); and (4) low perceived need (e.g., thought that treatment was not necessary because they already handled the problem).

2.3. Statistical analyses

Weighted percentages and means were computed to determine gender differences in the sociodemographic correlates, prevalence of psychiatric comorbidities, clinical course and characteristics, and treatment-seeking behaviors among respondents with lifetime DSM-IV CUD. Logistic regression analyses yielded odds ratios (ORs), indicating measures of association among: (1) Lifetime CUD and sociodemographic characteristics; (2) Lifetime CUD and psychiatric comorbidities; and (3) Lifetime CUD and treatment-seeking behaviors.

To ensure that gender differences in the risk of psychiatric comorbidities were not due to sociodemographic correlates or to gender differences in the distribution of psychiatric disorders in the general population, the association between gender, CUD, and comorbidity was examined using additional logistic regression models. These logistic regression models used each psychiatric disorder as the outcome variable, and included gender, lifetime CUD and their interaction as predictor variables. These models also adjusted for sociodemographic characteristics.

Due to the cross-sectional nature of the study, both unadjusted and adjusted ORs are used as measures of association without implying any causal association. We consider two percentages to be different if the 95% confidence interval of their ORs does not include 1.0 (Agresti and Min, 2002). All standard errors were estimated using SUDAAN to adjust for the design characteristics of the NESARC. Females (and individuals without CUD, when modeling interactions) were considered the reference group for all analyses.

3. Results

3.1. Sociodemographic characteristics

Previous data from the NESARC estimates that 11.8% of men and 5.4% of women meet criteria for a lifetime cannabis use disorder (CUD; Stinson et al., 2006). Table 1 shows that men with CUD were more likely than women to be older than 45 years (OR = 1.66, 95% CI = 1.34–2.06), to have a high school education or less, and to have an income above $20,000. Men were significantly less likely to be unemployed (OR = 0.53, 95% CI = 0.44–0.63) and widowed/divorced (OR = 0.71, 95% CI = 0.58–0.88; Table 1).

3.2. Psychiatric comorbidity

Among individuals with lifetime CUD, nearly 95% of both men and women met criteria for at least one other psychiatric disorder. After adjusting for sociodemographic correlates, men with

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