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Conduct disorder and adult psychiatric diagnoses: Associations and gender differences in the U.S. adult population

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ABSTRACT

The authors' objective was to examine the presence of Axis I and II psychiatric disorders among adult males and females with a history in childhood and/or adolescence of conduct disorder (CD).

Data were derived from a large national sample of the U.S. population. Face-to-face interviews of more than 34,000 adults ages 18 years and older were conducted during 2004–2005 using the Alcohol Use Disorder and Associated Disabilities Interview Schedule –DSM-IV Version.

After adjusting for sociodemographic characteristics and psychiatric comorbidity, CD was associated with all Axis I and II disorders, particularly substance use disorders (SUD), bipolar disorder, and histrionic personality disorders. After adjusting for gender differences in the general population, men had significantly greater odds of social anxiety disorder and paranoid personality disorder, whereas women were more likely to have SUD. Furthermore, there was dose–response relationship between number of CD symptoms and risk for most psychiatric disorders.

From a clinical standpoint, knowledge of the gender differences in associations of CD with other psychiatric disorders in adulthood may be informative of developmental pathways of the disorder, and of possible gender-specific risk factors. Early recognition and treatment of CD may help prevent the development of adult-onset disorders.

1. Introduction

Conduct disorder (CD) is highly prevalent in childhood and early adolescence, constituting one of the most common chief complaints in child mental health consultations. It is accompanied by significant impairment in most spheres of life (Kim-Cohen et al., 2005; Lambert et al., 2001; Maughan et al., 2004; Nock et al., 2006), high public health costs (Foster and Jones, 2005), and family burden (Sourander et al., 2007). The prevalence of CD has been estimated to range from 4 to 16% in males and from 2 to 9% in females (Cohen et al., 1993; Loeber et al., 2000; Nock et al., 2006). There are some indications that its prevalence may be increasing in Western societies (Angold and Costello, 2001).

In previous studies, a history of CD has been associated with the later development of mood, anxiety, and substance use disorders (SUD), and some studies have also documented that 45–70% of individuals with CD develop antisocial personality disorder (ASPD) in early adulthood (Gelhorn et al., 2007; Kim-Cohen et al., 2003; Lahey et al., 2002; Nock et al., 2006; Zoccolillo et al., 1992). However, the relationship between CD with Axis I psychopathology and the broader spectrum of personality disorders has not been previously examined. Understanding these associations is crucial to help clinicians develop a greater awareness of the risk of future psychopathology and to design appropriate treatment and preventive interventions.

Prior research has also suggested that the association of CD with other disorders varies by gender, leading to different psychopathology in men and women in adulthood. For instance, internalizing disorders are more commonly associated with CD in adolescent girls than boys, whereas boys are more likely to develop externalizing disorders (Loeber and Keenan, 1994). However, whether gender differences in the association of CD with adult psychopathology are moderated by the presence of CD or merely reflect gender differences in the distribution of psychiatric disorders in the general population is unclear.

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Finally, an important question from a developmental psychopathology perspective is whether the severity of CD influences the risk of associated psychopathology, i.e., whether there is a dose–response relationship between severity of CD and risk of psychiatric and personality disorders in adulthood. Prior studies have found dose–response relationships among different subtypes of CD and Axis I psychopathology (Nock et al., 2006). However, whether these relationships may apply to Axis II psychopathology and vary by gender is unclear.

The goal of this study was to address these gaps in the literature. To our knowledge, this is the first large epidemiological study to examine the association between CD and the broad range of Axis I and II disorders, looking at differences in men and women. We draw on data from Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a large nationally representative sample of the US population ($N = 34{,}635$) collected in 2004–2005 (Grant et al., 2007). Our findings contribute to a better understanding of the gender differences in the association between CD and a broad range of psychiatric disorders in adults.

2. Methods

2.1. Sample

2.1.1. NESARC sample

The NESARC sample is a nationally representative sample of the adult population of the United States conducted by the Census Bureau under the direction of the National Institute on Alcohol Abuse and Alcoholism. The NESARC target population was non-institutionalized individuals aged 18 years and older in the civilian population residing in households and group living quarters; including residents of the continental United States, Columbia, Alaska and Hawaii. Blacks, Hispanics, and young adults (18–24 years old) were oversampled.

The 2004–2005 Wave 2 NESARC is the second Wave longitudinal follow-up of the Wave 1 NESARC, conducted in 2001–2002. The first wave included face-to-face interviews with 43,093 respondents, yielding and overall response rate of 81.0% as described in detail elsewhere (Grant et al., 2007, 2003a). The Wave 2 interview was conducted approximately 3 years later (mean interval: 36.6 (s.e. 2.6) months). Excluding individuals who were ineligible (e.g., deceased), the response rate in wave 2 was 86.7%, reflecting 34,653 completed interviews. The cumulative response rate of Wave 2 was equal to the product of Wave 1 and Wave 2 response rates, or 70.2% (Grant et al., 2007). Wave 2 NESARC data were adjusted for non-response based on sociodemographic characteristics and presence of any lifetime Wave 1 NESARC SUD or other psychiatric disorder. The adjusted data are representative of the civilian population of the United States based on the 2000 Decennial Census (Grant et al., 2007). The research protocol, including informed consent procedures, received full ethical review and approval from the U.S. Census Bureau and the U.S. Office of Management and Budget.

2.2. Assessment

2.2.1. Sociodemographic characteristics

Sociodemographic characteristics included sex, race-ethnicity, nativity, age, education, marital status, place of residence, employment status, and personal and family income.

2.2.2. Psychiatric diagnoses

All psychiatric diagnoses were made according to DSM-IV-TR criteria (American Psychiatric Association, 2000) using the Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV Version (AUDADIS-IV), Wave 2 version (Grant et al., 2004b), a reliable and valid diagnostic interview designed to be used by trained interviewers.(Grant et al., 2001) Conduct disorder was assessed retrospectively through 20 items that yielded a Cronbach's alpha of 0.72. All questions included in the AUDADIS-IV reflected CD DSM-IV conduct disorder criteria and the 4 dimensions of the disorder(aggression to people and animals, destruction of property, deceitfulness or theft and serious violations of rules), (e.g. *"Have you often cut class, not go to class, or go but then leave without permission?: Has there been a time when you bullied or pushed people around or tried to make them afraid of you?"; Has there been a time of your life when you lied a lot, not counting any times to lied to keep from being hurt?…*) All criteria had to be endorsed before age 15.

Extensive AUDADIS-IV questions covered DSM-IV criteria for alcohol and drug-specific abuse and dependence for 10 classes of substances. The good to excellent ($\kappa = 0.70–0.91$) test-retest reliability of AUDADIS-IV substance use diagnoses is documented in clinical and general population samples (Grant et al., 2003b; Hasin et al., 1997). Convergent, discriminant, and construct validity of AUDADIS-IV substance use disorder criteria and diagnoses were good to excellent (Hasin et al., 1990, 2003).

Mood disorders included DSM-IV major depressive disorder (MDD), bipolar I and II, and dysthymia. Diagnoses of MDD ruled out bereavement. Anxiety disorders included DSM-IV panic disorder, social anxiety disorder, specific phobias, generalized anxiety disorder (GAD), and posttraumatic stress disorder (PTSD). AUDADIS-IV methods to diagnose these disorders are described in detail elsewhere (Grant et al., 2004a, 2005, 2006). Attention-deficit/hyperactivity disorder (ADHD) was assessed in the Wave 2 NESARC. Suicide attempts were assessed only in individuals who reported having been sad, blue depressed or having a period that they did not care about things that they usually enjoyed for at least 2 weeks. In those cases, suicide attempt was assessed and computed for those who reported having attempted suicide during that period.

Personality disorders assessed on a lifetime basis at Wave 1 and described in detail elsewhere (Compton et al., 2005; Grant et al., 2005) included avoidant, dependent, obsessive-compulsive, paranoid, schizoid, histrionic, and antisocial personality disorders. Borderline, schizotypal, and narcissistic personality disorders were measured at Wave 2.

Test-retest reliabilities for AUDADIS-IV mood, anxiety, personality disorders, and ADHD diagnoses in the general population and clinical settings were fair to good ($\kappa = 0.40–0.77$)(Canino et al., 1999; Ruan et al., 2008). Test-retest reliabilities of AUDADIS-IV personality disorders compare favorably with those obtained in patient samples using semi structured personality interviews (Zimmerman, 1994). Convergent validity was good to excellent for all affective, anxiety, and personality disorders diagnoses (Grant et al., 2005, 2006), and selected diagnoses showed good agreement ($\kappa = 0.64–0.68$) with psychiatrist reappraisals (Canino et al., 1999).

2.2.3. Statistical analyses

Weighted means, frequencies and odds ratios (ORs) of sociodemographic correlates, prevalence of lifetime and current DSM-IV psychiatric disorders were computed. Adjusted odds ratios were derived from multiple logistic regressions with CD as the predictor variable and presence of each psychiatric disorder as the outcome, adjusting for sociodemographic characteristics and other psychiatric comorbidity. Gender differences in psychiatric comorbidity among individuals with CD, adjusting for gender differences in the prevalence of psychiatric disorders in the general population, were examined using logistic regression models with each psychiatric disorder as the outcome and using as predictors gender, CD and