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Trends in prescription drug abuse and dependence, co-occurrence with other substance use disorders, and treatment utilization: Results from two national surveys

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Abstract

Objectives—This study examined trends in prescription drug abuse and dependence (sedatives, tranquilizers, opioids, and stimulants), co-occurrence with other substance use disorders and substance abuse treatment utilization among those with diagnoses of prescription drug abuse and dependence in two large, nationally representative, independent samples of adults in the United States in 1991–1992 and 2001–2002.

Methods—Two nationally representative cross-sectional samples of civilian noninstitutionalized adults 18 years or older in the United States, of which 52% were women. Data were collected from structured diagnostic interviews using the NIAAA Alcohol Use Disorder and Associated Disabilities Interview Schedule: *Diagnostic and Statistical Manual* version IV (DSM-IV). National prevalence estimates were derived from the 1991–1992 National Longitudinal Alcohol Epidemiologic Survey (N = 42,862) and the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions (N = 43,093).

Results—The past-year prevalence of prescription sedative abuse, sedative dependence, opioid abuse, and opioid dependence increased from 1991–1992 to 2001–2002. The majority of individuals with past-year sedative (56.8%), tranquilizer (89.0%), stimulant (67.9%) and opioid (74.2%) use disorders also met DSM-IV criteria for an additional past-year substance use disorder. The co-occurrence of several forms of prescription drug use disorders and other substance use disorders increased from 1991–1992 to 2001–2002. A minority of individuals with past-year prescription drug abuse and approximately one-half of those with past-year prescription drug dependence utilized substance abuse treatment.

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Conclusions—The findings reinforce the importance of continued national monitoring based on the increases in prescription drug abuse and dependence, high co-occurrence with other substance use disorders, and underutilization of substance abuse treatment services.

Keywords

Epidemiology; DSM-IV; substance use disorders; prescription drugs; substance abuse treatment utilization

1. Introduction

There is growing evidence that nonmedical use of prescription drugs has increased over the past two decades in the United States (Johnston et al., 2007; McCabe et al., 2007a; SAMSA, 2004). Despite public health concerns regarding non-medical use, there is relatively little information regarding trends in prescription drug abuse and dependence based on clinically relevant measures, such as those based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) (APA, 1994). While documentation of the prevalence estimates of non-medical use of prescription drugs is important, understanding the trends associated with prescription drug abuse and dependence is more relevant to substance abuse treatment efforts. Blanco and colleagues (2007) examined the trends in prescription drug use disorders and found evidence for increases over a ten-year period but the investigation did not examine abuse and dependence separately so it was unclear whether changes were driven by abuse or dependence.

Previous research has shown that non-medical use of prescription drugs is highly associated with other drug use behaviors, including cigarette smoking, heaving drinking, marijuana use, and other illicit drug use among adolescents (Boyd et al., 2006; Herman-Stahl et al., 2006; McCabe et al., 2004) and adults (Herman-Stahl et al., 2007; Huang et al., 2006; McCabe et al., 2006a; SAMHSA, 2006a). Although associations between non-medical use of prescription drugs and other substance use behaviors are important to understand, the relationships between prescription drug use disorders and other substance use disorders have important implications for developing effective prevention and intervention strategies. For example, a more detailed understanding of the prevalence and trends in co-occurrence of prescription drug use disorders and other substance use disorders could help inform the development of screening instruments and brief interventions to reduce prescription drug use disorders in primary care settings.

Recent research has shown that alcohol use disorders are more prevalent among non-medical users of prescription drugs (Blanco et al., 2007; Huang et al., 2006; McCabe et al., 2006a). In addition, Stinson and colleagues (2005) found strong associations between past-year alcohol use disorders and other drug use disorders including several classes of prescription drugs (e.g., tranquilizers, opioids, and stimulants). At least two studies have found evidence for positive associations between prescription drug use disorders and other lifetime substance use disorders (Blanco et al., 2007; Huang et al., 2006), but these investigations did not use past-year time frames. As a result, there is limited information regarding the trends in past-year co-occurrence of prescription drug abuse and dependence with other substance use disorders in the United States, and this leaves an important knowledge gap. The lack of information is largely attributable to the fact that national drug studies do not contain the necessary clinically relevant items to assess prescription drug use disorders and/or use different methodologies, which makes it difficult to examine prevalence trends.

Existing research indicates that the majority of individuals with substance use disorders in the United States do not utilize substance abuse treatment services (Cohen et al., 2007; SAMHSA, 2006a; Wang et al., 2005). Cohen and colleagues (2007) found the leading reasons for not utilizing alcohol treatment were the belief that one should be strong enough to handle a drinking problem alone followed by the expectation that the problem would improve spontaneously. Despite the evidence for underutilization, there is limited information regarding the extent of unmet need for substance abuse treatment among individuals diagnosed with prescription drug abuse and dependence, because past studies have generally combined abuse and dependence diagnoses when studying treatment utilization (Blanco et al., 2007; SAMHSA, 2006a; Stinson et al., 2005). Indeed, recent findings reinforce the importance of examining substance abuse treatment utilization separately for those with alcohol abuse versus alcohol dependence based on different patterns associated with these diagnoses (Cohen et al., 2007). A more comprehensive understanding of substance abuse treatment utilization among individuals with prescription drug abuse and prescription drug dependence is paramount for developing effective substance abuse treatment efforts.

The main objectives of this investigation were to 1) assess the trends in past-year prevalence of prescription drug abuse and dependence (i.e., sedatives, tranquilizers, opioids, and stimulants) between 1991–1992 and 2001–2002; 2) assess the trends in past-year co-occurrence of prescription drug use disorders and other substance use disorders between 1991–1992 and 2001–2002; and 3) assess substance abuse treatment utilization among individuals reporting past-year prescription drug abuse and dependence between 1991–1992 and 2001–2002.

2. Materials and methods

2.1. Design and sample

Data collected from the 1991–1992 National Longitudinal Alcohol Epidemiologic Survey (NLAES) and the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) were used as the primary sources of information regarding alcohol and other drug use among the general population in the United States. The datasets for these two studies were publically available and the sampling design has been described in detail elsewhere (Compton et al., 2004; Grant et al., 1992). Both the NLAES and NESARC included the NIAAA Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV Version (AUDADIS-IV), a fully structured diagnostic interview conducted in households. The AUDADIS-IV was interviewer-administered in the NLAES using a paper-and-pencil instrument, and the AUDADIS-IV was computerized and responses were entered directly into laptop computers for the NESARC. The samples for both the NLAES and NESARC were representative of the civilian noninstitutionalized population, 18 years of age and older, currently residing in the U.S. The NLAES and NESARC samples included persons living in households, military personnel living off base, and persons residing in the following group quarters: boarding or rooming houses, nontransient hotels, shelters, facilities for housing workers, college quarters and group homes. The overall response rate for the NLAES was 90%; the household response rate was 92%, and the person response rate was 98%, with a final N=42,862. The overall response rate for the NESARC was 81%; the household response rate was 89%, and the person response rate was 93%, with a final N=43,093.

The NLAES sample consisted of approximately 52% women, 77% Whites, 11% African Americans, 3% Asians, 7% Hispanics and 2% Native Americans or other racial category. Fourteen percent of the sample was 18 to 24 years of age and 86% was 25 years of age or older. Similarly, the NESARC sample consisted of approximately 52% women, 71%

Whites, 11% African Americans, 4% Asians, 12% Hispanics and 2% Native Americans or other racial category. Thirteen percent of the sample was 18 to 24 years of age and 87% was 25 years of age or older.

2.2. Measures

The measures in the NLAES and NESARC surveys assessed alcohol use, illicit drug use, non-medical use of prescription drugs and substance use disorders. *Demographic and background characteristics* were measured with several items, including sex, age, race/ethnicity, marital status, and geographical region based on the U.S. Census (Northeast, South, North Central and West).

Substance use disorders were assessed according to the criteria of the DSM-IV using the AUDADIS-IV, including drug-specific diagnoses for each of the four classes of prescription drugs (i.e., sedatives, tranquilizers, opioids, stimulants), alcohol, illicit drugs (i.e., marijuana, cocaine, hallucinogens or heroin). Each of the following classes of prescription medications were listed separately: (1) Sedatives (e.g., sleeping pills, Seconal, Quaaludes); (2) Tranquilizers or anti-anxiety drugs (e.g., Valium, Librium, Xanax); (3) Painkillers (e.g., Codeine, Darvon, Percodan, Dilaudid, Demerol); and (4) Stimulants (e.g., Preludin, Benzedrine). The same wording was used in each survey and a more extensive list of specific prescription drugs within each category is available elsewhere (Grant et al., 2006).

Consistent with the DSM-IV, a past-year AUDADIS-IV diagnosis of substance abuse required at least one positive response to four criteria defined for abuse in the 12-month period preceding the interview and the absence of a dependence diagnosis. A past-year AUDADIS-IV diagnosis of substance dependence was defined as a positive response to at least 3 of the 7 dependence criteria. The test-retest reliability coefficients (kappas) associated with past-year DSM-IV, AUDADIS-IV diagnoses of alcohol use disorder was $\kappa = 0.74$ (Grant et al., 2003) and prescription drug use disorders ranged from $\kappa = 0.69$ to 0.96 in other studies, and the validity of the abuse and dependence diagnoses has been established in several previous studies (Cottler et al., 1997; Grant et al., 1995, 1996, 2003; Hasin et al., 1996, 1997; Nelson et al., 1999; Pull et al., 1997). In the NLAES, abuse and dependence diagnoses were made for drug users, defined as ever having tried any of the drugs in any of the following drug classes at least twelve times (e.g., marijuana, cocaine, hallucinogens, heroin, sedatives, tranquilizers, opioids other than heroin, and stimulants). The use of drugs "at least 12 times" was applied as a threshold in the NESARC in order to make the 2001–2002 NESARC estimates directly comparable to the 1991–1992 NLAES estimates. Finally, respondents were asked to consider non-medical use of drugs that were not prescribed to them by a doctor or used in a manner not intended by the prescribing clinician (e.g., more often than prescribed, longer than prescribed, or for a reason other than prescribed, such as to get high).

Co-occurrence of prescription drug use disorders and other substance use disorders was based on measures constructed using both the NLAES and NESARC data. Nineteen binary variables of co-occurrence in the past year were created for the respondents in both data sets: (1) four variables based on a prescription drug use disorder diagnosis for each of the four classes of prescription drugs and alcohol use disorder; (2) four variables based on a prescription drug use disorder diagnosis for each of the four classes of prescription drugs and substance use disorders for marijuana, cocaine, and/or heroin; (3) four variables based on a substance use disorder diagnosis for each of the four classes of prescription drugs and the remaining prescription drug use disorders; (4) four variables based on a prescription drug use disorder diagnosis for each of the four classes of prescription drugs and *any* other substance use disorder (i.e., alcohol, marijuana, cocaine, heroin, and the remaining prescription drugs); (5) a single variable based on prescription drug use disorder diagnosis

for *any* of the four prescription drugs and alcohol use disorder; (6) a single variable based on prescription drug use diagnosis for *any* of the four classes of prescription drugs and substance use disorders for marijuana, cocaine, and/or heroin; and (7) a single variable based on prescription drug use disorder diagnosis for *any* of the four classes of prescription drugs and *any* substance use disorder (i.e., alcohol, illicit drugs).

Alcohol and/or drug treatment utilization in the NLAES and NESARC was measured by asking respondents about substance abuse treatment utilization for alcohol and other drugs in the past 12 months. Alcohol treatment utilization included use of the following community agencies and professionals: (1) Alcoholics Anonymous, Narcotics or Cocaine Anonymous, or any 12-step meeting; (2) family services or another social service agency; (3) alcohol or drug detoxification ward or clinic; (4) inpatient ward of a psychiatric or general hospital or community mental health program; (5) outpatient clinic, including outreach programs and day or partial patient programs; (6) alcohol or drug rehabilitation program; (7) emergency room for any reason related to drinking; (8) halfway house or therapeutic community; (9) crisis center for any reason related to your drinking; (10) employee assistance program; (11) clergyman, priest, rabbi, or any type of religious counselor for any reason related to your drinking; (12) private physician, psychiatrist, psychologist, social worker, or any other professional. In the NLAES, some variables were combined to make them comparable with the corresponding variables in the NESARC (for example, the two NLAES variables “Outpatient clinic [include outreach programs]” and “Day program or partial patient program” were combined into a single variable for comparison with the NESARC variable “Outpatient clinic, including outreach programs and day or partial patient programs”). We excluded two NLAES treatment utilization variables, “Vocational rehabilitation” (n = 15) and “Natural therapist,” (n = 10) because they had no equivalent in the NESARC. In both the NLAES and NESARC, respondents were also asked a separate series of questions related to 12-month drug treatment utilization that paralleled those related to alcohol treatment. For purposes of analysis in this study, we created dichotomous (yes/no) variables representing utilization of the specific types of past-year substance abuse treatment as well as utilization of *any* past-year substance abuse treatment for either alcohol or other drugs.

2.3. Data Analysis

Individual respondents to each survey living in households and group quarters were assigned base weights calculated as the products of the conditional probabilities of selection at the first two sampling stages. These weights were further adjusted to account for several other factors, including individual- and household-level nonresponse, and a poststratification adjustment factor was incorporated to ensure that weighted NLAES and NESARC data were representative of the U.S. civilian noninstitutionalized adult population with respect to several demographic variables (e.g., age, gender and race/ethnicity) (Grant et al., 2004). In the analyses performed for the present study, procedures for the analysis of complex sample survey data (i.e., weighted, stratified, and clustered survey data) in the SUDAAN statistical software package (Version 9.0.1) were used to take the complex sample designs into account when calculating parameter estimates and standard errors. Specifically, a Taylor Series Linearization approach was used to estimate the standard errors of all weighted statistical estimates. Methods appropriate for subpopulation analyses of survey data (Cochran, 1977) were utilized when appropriate.

To examine trends in prescription drug abuse and dependence for 1991–1992 and 2001–2002, weighted, design-based 12-month prevalence rates of prescription drug abuse and dependence were estimated. Design-based standard errors for the estimated proportions were computed, allowing for the calculation of 95% confidence intervals (CIs) for the population prevalence rates. The estimated prevalence rates for each type of prescription drug abuse

and dependence from the two independent samples were compared statistically using a technique discussed by Altman and Bland (2003), in an effort to determine whether the changes in prevalence of prescription drug abuse and dependence were statistically significant. To examine the prevalence of co-occurrence of past-year prescription drug use disorders and other substance use disorders, subpopulations of individuals in both the NLAES and the NESARC studies meeting diagnostic criteria for specific prescription drug use disorders were analyzed to estimate the proportions of those individuals also meeting criteria for other substance use disorders.

To examine trends in the prevalence of past 12-month co-occurrence of prescription drug use disorders and other substance use disorders for 1991–1992 and 2001–2002, we estimated weighted, design-based prevalence rates of each of the 19 types of co-occurrence (as described in the measures section) and computed standard errors appropriately reflecting the complex sample designs. The estimated prevalence rates were once again compared in an effort to assess whether the changes in prevalence of co-occurrence were statistically significant. To examine changes in the prevalence of past 12-month co-occurrence of prescription drug use disorders and any other substance use disorder for specific subpopulations between 1991–1992 and 2001–2002, we estimated weighted, design-based prevalence rates for subpopulations defined by the following demographic characteristics: gender, race/ethnicity, age, marital status and geographical region. Previous research has shown these subpopulations are relevant when considering nonmedical use and prescription drug use disorders (e.g., Huang et al., 2006; McCabe et al., 2006). These subpopulation estimates were also compared in the manner described earlier to determine whether the changes in prevalence of co-occurrence were statistically significant.

Finally, analyses for substance abuse treatment utilization focused on the subpopulations of respondents indicating a diagnosis of abuse or dependence for a specific prescription drug in the past year. Weighted, design-based estimates of the proportions of these individuals utilizing substance abuse treatment in the past 12 months were calculated for both the NLAES and NESARC samples. These estimated prevalence rates were also compared to determine whether the changes in prevalence of substance abuse treatment utilization from 1991–1992 to 2001–2002 were statistically significant for these subpopulations.

3. Results

3.1. Trends in prevalence of prescription drug abuse and dependence in the United States

As illustrated in Table 1, the past-year prevalence for any prescription drug abuse increased from 0.17% in 1991–1992 to 0.28% in 2001–2002 ($p < 0.01$), whereas the past-year prevalence for any prescription drug dependence increased from 0.12% in 1991–1992 to 0.20% in 2001–2002 ($p < 0.05$). Furthermore, increases were observed for the following specific types of prescription drug use disorders from 1991–1992 to 2001–2002: sedative abuse ($p < 0.01$), sedative dependence ($p < 0.01$), opioid abuse ($p < 0.01$), and opioid dependence ($p < 0.05$). Finally, there were no significant increases in the prevalence of tranquilizer abuse, tranquilizer dependence, stimulant abuse or stimulant dependence.

3.2. Prevalence and trends of other substance use disorders among those with prescription drug use disorders

Table 2 illustrates the prevalence of other past-year substance use disorders among those with past-year prescription drug use disorders in 1991–1992 and 2001–2002. In both survey years, the majority of individuals with a past-year prescription drug use disorder also met the criteria for another past-year substance use disorder, which included alcohol use disorders and illicit drug use disorders (i.e., marijuana, cocaine, and/or heroin). The co-occurrence

rates were highest for past-year prescription drug use disorders and alcohol use disorders, followed by prescription drug use disorders and illicit drug use disorders. Among those with a past-year prescription drug use disorder, approximately one in every two individuals also met the criteria for an alcohol use disorder, while about one in every three individuals met the criteria for an illicit drug use disorder. Overall, there were few differences in the prevalence of other past-year substance use disorders among those with past-year prescription drug use disorders between 1991–1992 and 2001–2002. As illustrated in Table 2, there were some significant decreases among those with prescription sedative use disorders and increases among those with prescription stimulant and tranquilizer use disorders.

Next, the overall past-year prevalence rates of co-occurring prescription drug use disorders and other substance use disorders for the full samples were examined. There were increases in several specific types of co-occurrence of prescription drug use disorders and other substance use disorders between 1991–1992 and 2001–2002. For example, there were increases in past-year co-occurrence of prescription sedative use disorder and any substance use disorder ($p < 0.01$), prescription opioid use disorder and any substance use disorder ($p < 0.01$), any prescription drug use disorder and alcohol use disorder ($p < 0.05$), and prescription opioid use disorder and alcohol use disorder ($p < 0.01$). Notably, there were no significant increases in types of co-occurrence involving tranquilizer or stimulant use disorders.

Table 3 shows the past-year prevalence of any prescription drug use disorder and any other substance use disorder for several subgroups in both samples. In both years, the past-year prevalence rate for the co-occurrence of prescription drug use disorders and other substance use disorders was highest among men, individuals 18 to 29 years of age, Native Americans, and the never married. As shown in Table 3, changes in the past-year prevalence for co-occurrence as a function of gender, race/ethnicity, age, marital status, and geographic location were also examined. The results showed that the prevalence of co-occurrence increased significantly for the following subpopulations: males, African-Americans, individuals older than 45 years of age, individuals who were widowed, divorced or separated, and individuals residing in the Northeastern region of the United States.

3.3. Trends in substance abuse treatment utilization among individuals with prescription drug abuse or dependence

The majority of individuals with past-year prescription drug abuse had not utilized substance abuse treatment in the past 12 months (see Table 4). Among those with prescription drug abuse, there was a significant decline in substance abuse treatment utilization from 36.4% in 1991–1992 to 14.4% in 2001–2002 ($p < 0.01$). The pattern of lower treatment utilization among those with prescription drug abuse compared to those with prescription drug dependence held true across individual prescription drug classes.

The utilization of substance abuse treatment was higher among individuals with past-year prescription drug dependence as compared to those with past-year prescription drug abuse, especially in 2001–2002. Approximately one-half of individuals with prescription drug dependence utilized substance abuse treatment in the past 12 months in 1991–1992 and 2001–2002. The prevalence of substance abuse treatment utilization among individuals with prescription drug dependence remained relatively stable between 1991–1992 and 2001–2002. For example, an estimated 52.4% of those who met the criteria for past-year prescription drug dependence in 1991–1992 reported substance abuse treatment utilization in the past 12 months as compared to 53.9% of those with past-year prescription drug dependence in 2001–2002.

This study also examined the trends in *specific* types of past-year substance abuse treatment among individuals with past-year diagnoses of prescription drug abuse and dependence. As seen in Table 5, the leading type of substance abuse treatment utilized by individuals with past-year prescription drug abuse or dependence in 1991–1992 and 2001–2002 was a 12-step meeting (e.g., Alcoholics Anonymous, Narcotics Anonymous). Other leading types of substance abuse treatment utilization among those with past-year prescription drug abuse or dependence in 1991–1992 and 2001–2002 were health professionals (e.g., physician, psychiatrist, psychologist, social worker), drug detoxification and drug rehabilitation programs. Overall, there were not many significant changes in treatment utilization among those with past-year prescription drug abuse and dependence. Among individuals who believed they should ever utilize treatment but did not go, the two leading reasons were because they thought they should be strong enough to handle alone and thought the problem would get better by itself.

4. Discussion

The findings of the present study revealed that the prevalence of diagnoses of several types of prescription drug abuse and dependence increased significantly from 1991–1992 to 2001–2002. In particular, diagnoses of sedative abuse, sedative dependence, opioid abuse, and opioid dependence increased between these two time periods. These upward trends mirror and extend similar increases observed in prescription drug use disorders and non-medical use of prescription drugs over this same time period in the United States (Johnston et al., 2007; McCabe et al., 2007a; Blanco et al., 2007). While the increases in past-year diagnoses of prescription drug abuse and dependence between 1991–1992 and 2001–2002 represent a concern, the actual prevalence rates of prescription drug abuse and dependence remain lower than the prevalence of alcohol and marijuana use disorders in the United States (Stinson et al., 2005; Compton et al., 2004; Grant et al., 2004). Nevertheless, the results of the present study provide an improved understanding of the patterns associated with prescription drug use disorders and have several important implications for substance abuse treatment efforts.

If the increases from the present study were extrapolated to the total U.S. adult general population, the number of U.S. adults who met the criteria for past-year prescription drug abuse increased from approximately 314,891 in 1991–1992 to 579,009 in 2001–2002 and the number of U.S. adults who met the criteria for past-year prescription drug dependence rose from approximately 232,007 to 425,601 over this same time period. Furthermore, the majority of individuals with past-year diagnoses of prescription drug abuse and dependence also met criteria for another past-year substance use disorder in both 1991–1992 and 2001–2002. For instance, more than 60% of individuals with a past-year prescription opioid disorder met the criteria for another past-year substance use disorder. Our results extend the findings of previous studies that show individuals with alcohol use disorders have increased odds of prescription drug use disorders and nonmedical use of prescription drugs compared to individuals without alcohol use disorders (McCabe et al., 2006; Stinson et al., 2005; Johansson et al., 2003).

The increase in prescription drug use disorders and co-occurrence with other substance use disorders could partially contribute to a shift in primary drugs of abuse observed in substance abuse treatment programs in the United States between 1993 and 2003 (SAMHSA, 2006c). Indeed, there is evidence that the substance abuse profile of individuals entering substance abuse treatment in the United States changed in the past decade according to the Treatment Episode Data Set (TEDS), which collects data on admissions to substance abuse treatment facilities (SAMHSA, 2006d). For instance, the percentage of substance abuse treatment admissions reporting alcohol as the primary substance of abuse decreased from 57% in 1993 to 41% in 2003, while the percentage of substance abuse

treatment admissions for marijuana, opiates and stimulants increased from approximately 22% in 1993 to 41% in 2003 (SAMHSA, 2006c).

Recent research has indicated that the majority of people with prescription drug use disorders did not receive substance abuse treatment (Blanco et al., 2007; Huang et al., 2006). The present study extended previous work and examined substance abuse treatment utilization separately for those individuals with a past-year diagnoses of prescription drug abuse and dependence. This more detailed approach revealed that approximately 86% of those with past-year prescription drug abuse and about 46% of those with past-year prescription drug dependence had not received substance abuse treatment in the previous 12 months in 2001–2002. Consistent with research on individuals with alcohol use disorders, the most prevalent form of substance abuse treatment reported by those with prescription drug abuse and dependence was 12-step meetings such as Alcoholics Anonymous and Narcotics Anonymous (Cohen, 2007).

Based on these results, more efforts are needed to identify individuals with prescription drug abuse and dependence and remove potential barriers for substance abuse treatment utilization. The present study found the two leading reasons among individuals who believed they should ever utilize treatment but did not go, were the belief that one should be strong enough to handle a drug problem alone and the expectation that the drug problem would improve spontaneously. Health professionals in primary care settings can use this information to educate and motivate individuals to utilize substance abuse treatment. At least one study found that primary care physicians believed discussions with patients regarding prescription drug abuse were more difficult than discussions regarding alcohol abuse or depression (NCASA, 2000). Clinicians are encouraged to conduct thorough drug use histories when working with individuals they suspect meet criteria for prescription drug abuse and dependence. In particular, screening efforts for prescription drug use disorders should assess polydrug use and the presence of co-occurring psychiatric disorders. Health professionals (e.g., private physicians, psychiatrists, psychologists, and social workers), drug detoxification facilities and substance abuse treatment programs should monitor for withdrawal from multiple substances when working with patients detoxifying from prescription drugs since these are the three most prevalent types of substance abuse treatment utilized by those with prescription drug dependence.

There are several strengths and limitations that are noteworthy based on the objectives of the present study. The NLAES and NESARC used similar methodology and contained nearly identical survey wording which allowed for valid comparisons of estimates based on data collected in these two national studies. For instance, the inclusion of DSM-IV criteria to assess substance use disorders in 1991–1992 and 2001–2002 represents an important strength for these two national studies. The large, nationally representative samples of the NLAES and NESARC allowed for calculation of national prevalence estimates for several individual prescription drug classes and types of substance abuse treatment.

There were also some limitations that should be taken into account while considering implications of the findings. First, the prevalence estimates of prescription drug abuse and dependence were underestimated because participants who used a drug less than 12 times in their lifetime were not considered in order to make the 2001–2002 NESARC estimates directly comparable to the 1991–1992 NLAES estimates. The omission of such individuals resulted in lower estimates of prescription drug use disorders, and the adjustment had a greater impact on prevalence estimates of abuse than dependence. For example, the prevalence of past-year nonmedical prescription opioid abuse in the NESARC was 0.24% without restricting to those who used prescription opioids 12 or more times in their lifetime as compared to 0.17% when restricting to those who used prescription opioids 12 or more

times in their lifetime (Table 1). In contrast, the prevalence of past-year nonmedical prescription opioid dependence in the NESARC was 0.11% without restricting to those who used prescription opioids 12 or more times in their lifetime as compared to 0.10% when restricting to those who used prescription opioids 12 or more times in their lifetime. Second, since the present study represented secondary analyses, the survey items in the NLAES and NESARC limited what could be examined. The present study likely underestimated the prevalence of prescription drug use disorders some commonly misused prescription drugs (e.g. Vicodin, OxyContin, Ritalin, Adderall) were not listed that have been shown to have high rates of NMUPD (Johnston et al., 2007; SAMHSA, 2006a; Teter et al., 2006). Furthermore, the measures to assess non-medical use of prescription drugs in the NLAES and NESARC failed to distinguish between patients who misused their own medication or alternatively, individuals who non-medically used someone else's prescription drugs which subsequently led to prescription drug abuse and dependence. In addition, the treatment utilization questions were not asked separately for prescription drugs so the present study can not distinguish between treatment utilization for prescription drugs specifically or other drugs. Third, the NLAES and NESARC were interviewer-administered so caution should be exercised when comparing results from these studies and other sources of data.

Despite these limitations, the findings from the present study provide several important directions for future research. First, the prevalence and co-occurrence of prescription drug use disorders and other substance use disorders should continue to be monitored, due to the observed increases among certain subpopulations of individuals between 1991–1992 and 2001–2002 (such as males). Second, based on the high rates of co-occurrence, longitudinal data are needed to determine whether prescription drug use disorders develop before or after other substance use disorders. Finally, future research should examine the course, consequences and treatment associated with different subtypes of prescription drug use disorders.

In summary, the present study provides evidence that there was an increase in prescription drug abuse and dependence in the United States from 1991–1992 to 2001–2002. This increase coincides with a shift in substance abuse behaviors of individuals entering substance abuse treatment in the United States over this same time period. The results showed that the majority of individuals with prescription drug use disorders also met the DSM-IV criteria for an additional co-occurring substance use disorder. The findings also showed that only a minority of individuals with past-year prescription drug abuse and approximately half of those with past-year prescription drug dependence utilized some form of substance abuse treatment in the past 12 months. Taken together, these findings have important implications for treating prescription drug use disorders in the United States. In particular, substance abuse treatment efforts should be prepared to deal with increasing prevalence rates of prescription drug use disorders in the general population, high rates of co-occurring substance use disorders and underutilization of substance abuse treatment among those with prescription drug use disorders.

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Table 1

Trends in past-year prevalence of DSM-IV prescription drug use disorders, 1991–1992 and 2001–2002

Prescription drug use disorders	1991–1992 NLAES % (SE), n	2001–2002 NESARC % (SE), n	Differences between 1991–1992 and 2001–2002 (Z statistic)
Any prescription drug abuse	0.17 (0.02), 314891	0.28 (0.03), 579009	3.05**
Any prescription drug dependence	0.12 (0.02), 232047	0.20 (0.03), 425601	2.22*
Prescription sedative abuse	<0.01 (<0.01), 6001	0.05 (0.01), 101298	4.61**
Prescription sedative dependence	0.02 (0.01), 31926	0.06 (0.01), 133190	2.83**
Prescription tranquilizer abuse	0.04 (0.01), 77323	0.05 (0.01), 112403	0.71
Prescription tranquilizer dependence	0.05 (0.01), 92111	0.04 (0.01), 87751	−0.71
Prescription opioid abuse	0.06 (0.01), 104121	0.17 (0.03), 350267	3.48**
Prescription opioid dependence	0.05 (0.01), 101400	0.10 (0.02), 203288	2.24*
Prescription stimulant abuse	0.09 (0.02), 167536	0.07 (0.02), 151451	−0.71
Prescription stimulant dependence	0.04 (0.01), 84259	0.07 (0.02), 138012	1.34

Note: Percentages and Ns are weighted estimates, and standard errors are computed based on Taylor Series Linearization.

* $p < 0.05$,

** $p < 0.01$

Table 2

Prevalence of other past-year substance use disorders among those with past-year DSM-IV prescription drug use disorders, 1991–1992 and 2001–2002

Prescription drug use disorders	Any substance use disorder[a] % (SE)	Alcohol use disorder % (SE)	Illicit drug use disorder[b] % (SE)	Other prescription drug use disorder % (SE)
1991–1992 NLAES				
Any prescription drug (n = 124)	61.31 (5.12)	54.60 (5.14)	34.66 (4.75)	--
Prescription sedative (n = 10)	89.00 (10.39)	68.41 (15.42)	61.46 (16.09)	75.46 (13.36)
Prescription tranquilizer (n = 39)	67.96 (8.78)	60.09 (9.01)	31.55 (7.18)	43.83 (9.26)
Prescription opioid (n = 48)	63.26 (6.66)	49.98 (6.71)	35.21 (7.12)	38.64 (9.27)
Prescription stimulant (n = 53)	71.78 (8.54)	63.41 (8.57)	42.19 (8.45)	11.29 (4.55)
2001–2002 NESARC				
Any prescription drug (n = 193)	57.81% (4.34)	50.74% (4.36)	32.59% (4.08)	--
Prescription sedative (n = 48)	56.81% (8.08)*	31.19% (6.70)*	23.24% (6.94)*	45.91% (8.05)
Prescription tranquilizer (n = 38)	89.00% (5.08)*	57.53% (9.44)	46.47% (9.84)	59.41% (9.16)
Prescrption opioid (n = 105)	67.89% (5.30)	54.11% (5.78)	37.79% (5.76)	27.16% (5.43)
Prescription stimulant (n = 51)	74.18% (8.50)	60.81% (8.74)	49.15% (8.65)	28.27% (7.29)*

Note: Percentages are weighted estimates, and standard errors are computed based on Taylor Series Linearization.

[a] Any substance use disorder refers to alcohol use disorder and/or illicit drug use disorder. For associations with sedative, tranquilizer, opioid, and stimulant disorders, “any substance use disorder” also included all other prescription drug use disorders.

[b] Illicit drug use disorders refers to marijuana, cocaine, and/or heroin.

* $p < 0.05$

Table 3

Changes in past-year prevalence of co-occurrence for specific subpopulations, 1991–1992 and 2001–2002

	Any Prescription Drug Use Disorder and any Substance Use Disorder		
	1991–1992 NLAES (n = 42,862) % (SE)	2001–2002 NESARC (n = 43,093) % (SE)	Differences between 1991–1992 and 2001–2002 Z-statistic[1], p-value
Gender			
Male	0.22 (0.04)	0.37 (0.06)	2.08*
Female	0.15 (0.03)	0.19 (0.03)	0.94
Race/Ethnicity			
White	0.20 (0.03)	0.27 (0.04)	1.40
African-American	0.04 (0.03)	0.16 (0.05)	2.06*
Native American	0.32 (0.33)	1.18 (0.40)	1.66
Asian	0.08 (0.07)	0.34 (0.19)	1.28
Hispanic	0.23 (0.08)	0.25 (0.09)	0.87
Age			
18–29	0.51 (0.08)	0.67 (0.11)	1.18
30–44	0.14 (0.03)	0.25 (0.05)	1.89
45+	0.02 (0.01)	0.12 (0.04)	2.43*
Marital status			
Married/Cohabitating	0.08 (0.02)	0.14 (0.03)	1.66
Never Married	0.56 (0.11)	0.56 (0.09)	0.00
Widowed/Divorced/Separated	0.13 (0.04)	0.45 (0.10)	2.97**
Geographical region			
Northeast	0.05 (0.03)	0.25 (0.06)	2.98**
Midwest	0.19 (0.04)	0.30 (0.08)	1.23
South	0.18 (0.05)	0.24 (0.05)	0.85
West	0.30 (0.04)	0.35 (0.07)	0.62

Note: Percentages are weighted estimates, and standard errors are computed based on Taylor Series Linearization.

[1] Calculated per methodology discussed in Altman and Bland (2003).

* $p < 0.05$,

** $p < 0.01$

Table 4

Past-year substance abuse treatment utilization among those with past-year prescription drug abuse or dependence, 1991–1992 and 2001–2002

Prescription drug use disorders	Treatment utilization 1991–1992 NLAES (n = 42,862) % (SE), n	Treatment utilization 2001–2002 NESARC (n = 43,093) % (SE), n	Differences between 1991–1992 and 2001–2002 (Z statistics)
Any prescription drug abuse	36.37 (7.04); n = 67	14.36 (3.60); n = 110	−2.78**
Any prescription drug dependence	52.38 (8.17); n = 57	53.90 (6.49); n = 81	0.15
Prescription sedative abuse	N/A	13.32 (7.58); n = 20	N/A
Prescription sedative dependence	N/A	45.94 (10.69); n = 27	N/A
Prescription tranquilizer abuse	48.77 (12.77); n = 21	36.56 (14.33); n = 21	−0.64
Prescription tranquilizer dependence	77.12 (10.99); n = 18	71.60 (12.10); n = 17	−0.34
Prescription opioid abuse	47.13 (14.03); n = 24	15.65 (5.04); n = 67	−2.11*
Prescription opioid dependence	58.15 (10.47); n = 24	59.45 (9.86); n = 36	0.09
Prescription stimulant abuse	32.23 (9.67); n = 33	14.41 (6.91); n = 25	−1.50
Prescription stimulant dependence	46.99 (12.30); n = 20	43.73 (11.36); n = 26	−0.19

Note: Percentages are weighted estimates, and standard errors are computed based on Taylor Series Linearization.

[1] Calculated using methodology discussed in Altman and Bland (2003).

N/A = sample sizes were too small to permit reliable estimates and comparisons.

* $p < 0.05$,

** $p < 0.01$.

Table 5

Past-year substance abuse treatment utilization among those with past-year prescription drug abuse or dependence, 1991–1992 and 2001–2002

	1991–1992 NLAES		2001–2002 NESARC	
Specific types of substance abuse treatment utilization	**Abuse (n = 67) % (SE)**	**Dependence (n = 57) % (SE)**	**Abuse (n = 111) % (SE)**	**Dependence (n = 82) % (SE)**
12-step meeting	21.54% (6.00)	38.35% (7.10)	7.94% (3.14)*	25.53% (5.72)
Alcohol or drug rehabilitation	5.62% (3.07)	22.08% (4.85)	2.55% (1.96)	23.72% (5.67)
Physician, psychiatrist, psychologist or social worker	4.83% (2.54)	28.45% (6.65)	3.80% (2.15)	21.68% (5.45)
Emergency room	2.37% (1.76)	12.96% (5.28)	2.02% (1.17)	5.57% (2.62)
Outpatient clinic	2.31% (1.74)	16.72% (4.53)	5.04% (2.36)	15.88% (4.76)
Alcohol or drug detoxification ward or clinic	2.09% (1.51)	17.80% (5.79)	4.51% (2.43)	20.79% (5.34)
Inpatient psychiatric unit	1.58% (1.58)	11.52% (4.83)	4.80% (2.52)	15.23% (4.67)
Crisis Center	1.58% (1.58)	1.03% (1.06)	0.00% (0.00)	3.96% (2.62)
Employee assistance program (EAP)	1.25% (1.25)	7.14% (3.35)	0.00% (0.00)	2.62% (1.74)
Halfway house or therapeutic communities	1.25% (1.25)	0.85% (0.87)	1.85% (1.54)	13.38% (4.51)**
Family or other social service agency	0.79% (0.79)	4.48% (2.40)	1.84% (1.40)	13.79% (4.17)
Clergyman, priest, rabbi, or other religious counselor	N/A	9.91% (4.03)	1.34% (0.88)	10.28% (3.60)

Note: Percentages are weighted estimates, and standard errors are computed based on Taylor Series Linearization.

[1] Z-statistic, p-value calculated per methodology discussed in Altman and Bland (2003) and test for differences between 1991–1992 and 2001–2002.

N/A = sample size was too small to permit reliable estimates and comparisons.

* $p < 0.05$,

** $p < 0.01$