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Drug use related problems among nonmedical users of prescription stimulants: A web-based survey of college students from a Midwestern university

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Abstract

This college-based study compared nonmedical users of prescription stimulants to other types of drug users regarding drug use related problems. A Web survey was self-administered in 2005 by a probability sample of 3639 full-time undergraduate students (68% response rate) at a large public Midwestern 4-year university in the United States. The survey consisted of measures to assess substance use and misuse, including a modified version of the Drug Abuse Screening Test (DAST-10). Nonmedical users of prescription stimulants were more likely than other drug users to report polydrug use. Nonmedical users of prescription stimulants had over four times greater odds than other drug users to experience three or more DAST-10 items in the past 12 months (AOR = 4.61, 95% CI = 3.28–6.48). Among nonmedical users of prescription stimulants, those who used prescription stimulants via intranasal and other non-oral routes of administration had greater odds than oral only users to experience three or more DAST-10 items in the past 12 months. The findings of the present study suggest that the majority of nonmedical users of prescription stimulants are polydrug users and should be screened for potential drug abuse or dependence, especially those who report non-oral routes of administration.

Keywords: Prescription stimulants; Prescription drug abuse; Drug dependence; Screening; Route of administration; College students

1. Introduction

Although it is well accepted that prescription stimulants are highly effective treatment for attention deficit/hyperactivity disorder (ADHD) in children, adolescents, and adults (Greenhill et al., 2002; Spencer, 2004), there is a growing body of research documenting the nonmedical use, abuse and dependence on prescription stimulants among adolescents and young adults in North America (e.g., Barrett et al., 2005; Johnston et al., 2005a,b; Kroutil et al., 2006; Marsh et al., 2000; Substance Abuse and Mental Health Services Administration (SAMHSA), 2005a,b. The past year nonmedical use, abuse or dependence on prescription stimulants used to treat ADHD is most prevalent among young adults 18–24 years of age (e.g., Johnston et al., 2005b; Kroutil et al., 2006; McCabe et al., 2005; SAMHSA, 2005a). Among young adults, there is evidence to suggest that the past-year nonmedical use of prescription stimulants (e.g., methylphenidate) may be more prevalent among college students as compared to their peers not attending college (Herman-Stahl et al., 2007; Johnston et al., 2005b). For purposes of this study, nonmedical use of prescription stimulants (NMUPS) refers to the use of a prescription stimulant by an individual without a physician's prescription for the medication.

To date, epidemiological research has established several important findings associated with the NMUPS among college students (e.g., Barrett et al., 2005; Hall et al., 2005; McCabe et al., 2006a; Teter et al., 2003, 2005; Upadhyaya et al., 2005; White et al., 2006). First, a recent college-based investigation found that the number of nonmedical users of prescription stimulants was greater than the number of medical users of prescription stimulants for ADHD among full-time undergraduate students attending a large public Midwestern university (McCabe et al., 2006a). Second, the leading motivations associated with NMUPS among college students are to (1) improve concentration/attention, (2) increase alertness, (3) help study and (4) use for recreational purposes (e.g., to get high) (Barrett

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et al., 2005; Hall et al., 2005; Teter et al., 2005, 2006; White et al., 2006). Third, NMUPS is highly correlated with other drug use behaviors among adolescents and young adults (Barrett et al., 2005; Teter et al., 2003; McCabe et al., 2004, 2005, 2006b; SAMHSA, 2006), regardless of the motive associated with nonmedical use (Teter et al., 2005). Collegiate nonmedical prescription stimulant users are more likely to report use of alcohol, cigarettes, marijuana, cocaine, and other drugs than their non-stimulant using peers (McCabe et al., 2005, 2006b; Teter et al., 2003, 2005). For example, over 80% of nonmedical users of prescription stimulants reported marijuana use in the past year as compared to approximately 30% of non-stimulant users (McCabe et al., 2005; Teter et al., 2005). Finally, approximately 40–50% of collegiate nonmedical users of prescription stimulants report using these drugs via the intranasal route of administration (Barrett et al., 2005; Teter et al., 2006; White et al., 2006).

Based on the high rates of non-oral administration that have been documented among college students, NMUPS should be taken very seriously as a potential public health problem. It has been well-established that alterations in the pharmacokinetics of a drug can significantly impact its abuse liability. More precisely, routes of administration that deliver drug to the brain faster are associated with greater reinforcing properties (Volkow and Swanson, 2003). Thus, students who engage in NMUPS via non-oral routes of administration may be placing themselves at higher risk for developing substance use disorders. However, the long-term consequences associated with human exposure to psychostimulants are not well understood and seem to depend on multiple variables, in addition to route of administration, such as age of exposure and dose administered (Fone and Nutt, 2005).

Although previous epidemiological studies have increased our understanding of the prevalence, motives and routes of administration associated with NMUPS, several important issues remain unexamined on the topic of prescription stimulant abuse and dependence. First, more research is needed to determine the extent of drug use related problems among nonmedical users of prescription stimulants. Among the few brief screening instruments to detect probable drug abuse or dependence for drugs other than alcohol, the Drug Abuse Screening Test (DAST-10) offers promise because it has been used in clinical and non-clinical settings to detect drug use related problems for drugs other than alcohol (Cocco and Carey, 1998; Skinner, 1982). While the DAST-10 items are not stimulant-specific and the clinical significance of a web-based version of the DAST-10 remains unknown, the DAST-10 is a well-validated instrument that has the ability to identify individuals who need more intensive assessment for substance abuse problems (Cocco and Carey, 1998). Second, there is scant information available regarding routes of administration associated with NMUPS (Compton and Volkow, 2006). Such information will help inform the development of prevention strategies to reduce the abuse and diversion of prescription stimulants. The main objectives of the present study were to (1) compare drug use related problems between nonmedical users of prescription stimulants and other types of drug users in an attempt to identify the characteristics specifically associated with NMUPS versus other types of drug use; and (2) examine drug use related problems among nonmedical users of prescription stimulants as a function of route of administration.

2. Methods

2.1. Study design

This investigation was part of a larger study of college students conducted in January and February of 2005. After receiving Institutional Review Board approval, a random sample of 5389 full-time undergraduate students was drawn from the total undergraduate population of 20,138 full-time students (10,339 women and 9799 men) at a large Midwestern university. The entire sample was mailed a pre-notification letter with $2 enclosed describing the study and inviting students to self-administer a Web survey by using a URL address and unique password. Informed consent was obtained online from each participant. Non-respondents were sent up to four reminder e-mails. The Web survey was maintained on an Internet site running under the secure socket layer protocol to ensure privacy and security. By participating in the survey, students became eligible for a sweepstakes that included cash and other prizes. The final response rate was 68%.

2.2. Sample

The sample consisted of 3639 undergraduate students. The demographic characteristics of the sample closely resembled the overall student population of the university. As illustrated in Table 1, the sample consisted of 53.6% women and 46.4% men. The racial/ethnic distribution of the sample was 67.4% White, 12.1% Asian, 6.0% African American, 4.5% Hispanic and 10.2% from other ethnic categories. The sample was made up of 28.5% freshmen, 23.4% sophomores, 23.1% juniors and 25.0% seniors. The mean age of students in the sample was 19.9 years old (S.D. = 2.0). Table 1 illustrates demographic characteristics for the overall sample, broken down by past year drug use status: nonmedical use of prescription stimulants ($n = 212$) or drug use other than nonmedical use of prescription stimulants ($n = 1164$) including marijuana, cocaine, LSD, psychedelics other than LSD, heroin, crystal methamphetamine, inhalants, ecstasy, and nonmedical use of pain medication, sleeping medication and sedative/anxiety medication.

2.3. Measures

Nonmedical use of prescription stimulants was assessed with the following question: "On how many occasions in (a) your lifetime or (b) the past 12 months have you used the following types of drugs, not prescribed to you?" Stimulant medication (e.g., Ritalin, Dexedrine, Adderall, Concerta, methylphenidate). Consistent with previous research, the response scale ranged from (1) No occasions to (7) 40 or more occasions (Johnston et al., 2005a,b). According to our definition, nonmedical users of prescription stimulants were also allowed to report the use of other drugs (not including alcohol) in the past year, as will be discussed in further detail.

Past year other drug use—including marijuana, cocaine, LSD, psychedelics other than LSD, heroin, crystal methamphetamine, inhalants, ecstasy, and nonmedical use of pain medication, sleeping medication and sedative/anxiety medication—was measured with the following question for each substance: "On how many occasions in the past 12 months have you used the following types of drugs?" The response scale for each substance was (1) no occasions to (7) 40 or more occasions. For purposes of analyses, the use of any of the 11 substances in the past year was summed to create an index of past year drug use.

Routes of administration were assessed by asking respondents who reported nonmedical use of prescription stimulants to indicate the route(s) of administration they used for taking prescription stimulants not prescribed to them by a doctor. Respondents were asked to select all that apply from a list of five routes including (1) orally, (2) snorting, (3) smoking, (4) injecting, and (5) inhaling. For purposes of analyses, a three-level indicator variable was created for route of administration consisting of *oral only, intranasal and oral*, and *other routes of administration*.