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Non-medical use of prescription drugs in a national sample of college women

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Abstract

Non-medical use of prescription drugs (NMUPD) is one of the fastest growing forms of illicit drug use, with research indicating that college students represent a particularly high risk population. The current study examined demographic characteristics, health/mental health, substance misuse, and rape experiences as potential risk correlates of NMUPD among a national sample of college women (N=2000). Interviews were conducted via telephone using Computer-Assisted Telephone Interviewing technology. NMUPD was assessed by asking if, participants had used a prescription drug non-medically in the past year. NMUPD was endorsed by 7.8% of the sample (n=155). Although incapacitated and drug–alcohol facilitated rape were associated with NMUPD in the initial model, the final multivariable model showed that only lifetime major depression and other forms of substance use/abuse were significantly uniquely associated with an increased likelihood of NMUPD. Implications for primary and secondary prevention and subsequent research are addressed.

Keywords

Non-medical use of prescription drugs; Substance use; Rape; Mental health; College women

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1. Introduction

A key risk period for the development of substance abuse is late adolescence into early adulthood (e.g., Johnston, O'Malley, & Bachman, 2003), which encompasses the typical ages of college students. Due to the complex interactions between individual level (e.g., familial risk and personality characteristics) and environmental level factors unique to the college experience (e.g., peer pressure, academic stress, cultural norms that govern substance use problems, and access to substances), college students are at high risk for substance use (McCabe, West, & Wechsler, 2007). College students, therefore, represent a population in which identification of risk factors for different classes of substance use problems is necessary for the development and implementation of prevention efforts.

One of the fastest growing classes of illicit drug use is the nonmedical use of prescription drugs (NMUPD; Johnston, O'Malley, Bachman, & Schulenberg, 2007; McCabe et al., 2007), which has been defined as “using a psychotherapeutic drug, even once, that was not prescribed for you, or that you took for only the experience or the feeling it caused” (Substance Abuse and Mental Health Services Administration (SAMHSA), 2002). Researchers have suggested that college students may be at higher risk for NMUPD compared to other groups, given the high accessibility of different classes of prescription drugs in the college/university setting, and the likelihood of students sharing their prescriptions with other students (McCabe, Teter, & Boyd, 2006). In addition, college students over-estimate the prevalence of NMUPD on their campuses, which may contribute to an erroneously held view of the normality of this behavior (McCabe, 2008).

1.1. Associates of non-medical use of prescription drugs

Research has revealed a number of correlates of NMUPD, including young age (18–25 years), Caucasian race, abuse/dependence of other substances, psychiatric conditions, and poor physical health (e.g., Ford & Arrastia, 2008; Herman-Stahl, Krebs, Kroutil, & Heller, 2007; Johnston et al., 2007; McCabe, 2005; McCabe, Knight, Teter, & Wechsler, 2005; McCabe, Teter, Boyd, Knight, & Wechsler, 2005). Lifetime history of exposure to potentially traumatic events also has been associated with increased likelihood of prescription drug use and misuse in a large epidemiologic sample (Kubiak, Arfken, Boyd, & Cortina, 2006). Recently, McCauley, Amstadter, Danielson, Ruggiero, Kilpatrick, & Resnick, 2009 found that having a lifetime history of rape that included features of drug or alcohol facilitation uniquely accounted for variance in lifetime NMUPD in a community sample of women. This finding is important for two reasons. First, potentially traumatic event exposure itself may increase risk of NMUPD. Second, exposure to potentially traumatic events has been consistently found to increase risk for mental health disorders (e.g., anxiety disorders and depression; Kilpatrick et al., 2003), which have also been identified as possible correlates of NMUPD (e.g., Huang et al., 2006). That is, history of traumatic event exposure is a potential contributor to NMUPD risk, and mental health correlates of exposure to traumatic events also may be associated with NMUPD, thereby further increasing the risk of NMUPD. For example, having a history of posttraumatic stress disorder (PTSD) and having a history of substance abuse were both uniquely associated with increased risk for NMUPD among community women (McCauley, Amstadter, et al., 2009).

1.2. Current study

Women are at a much higher risk for rape than men (almost 86% of rape victims are female; Tjaden & Thoennes, 2006), and the highest age-related risk group of sexual victimization is ages 18–34 years (encompassing the typical age of college students; Kilpatrick, Edmunds, & Seymour, 1992). Further, among college students, women appear to be generally at higher risk for NMUPD compared to men for most classes of drugs (McCabe, Teter, & Boyd, 2006); however, some studies report that men are at higher risk for misuse of stimulants (e.g., Simoni-Wastila, Ritter, & Strickler, 2004). Taken together, examination of various types of rape experiences in relation to NMUPD is a logical next step in the line of research aiming to identify risk associates of NMUPD in this high risk population. Therefore, the present study seeks to examine empirically established correlates (i.e., demographics, health/mental health and substance use) and hypothesized correlates of NMUPD (i.e., rape history — distinguishing among rape tactics that do and do not involve incapacitation of the victim) in a national sample of college women (n=2000). We predicted that both lifetime history of psychopathology, past year report of abuse of other substances, and lifetime rape experiences (specifically incapacitated rape [IR] and drug and alcohol facilitated rape [DAFR]) would be associated with significantly increased odds for NMUPD.

2. Method

2.1. Participants

The college sample consisted of a national sample of 2000 women. This list-based sample was purchased from the American Student List (ASL). The ASL includes about six million students who are attending approximately 1000 U.S. colleges and universities. The sample recruitment list purchased for our study contained about 17,000 respondents randomly selected from the ASL by region of the country, resulting in a sample that was similar to the national census representation of college women. Consistent with procedures used by Fisher, Cullen, and Turner (2000) in the National College Women Sexual Victimization (NCWSV) study, the sample was classified into nine regions and was dialed in proportion to the national census representation of college women to ensure adequate representation to the U.S. population of college women. Our sample included 253 different schools, from 47 different states. Sample characteristics are provided below in the Results section. All interviews were conducted by a national surveying firm, Abt SRBI (Schulman, Ronca, Bucuvalas, Incorporated) via telephone.

2.2. Measures

2.2.1. Non-medical use of prescription drugs (NMUPD)—To assess prescription drug use, women were first given the following information:

Doctors sometimes prescribe medicine to calm people down or to help them to relax their muscles, to help people sleep, deal with pain, or lose weight. Besides the medical uses, people sometimes take these pills on their own or non-medically. By non-medically we mean from a source other than your own prescription, beyond the amount you were told to take, or some reason other than prescribed.

They were then asked about past year non-medical use of various prescription drugs, including: tranquilizers (e.g., Valium), sedatives (e.g., Ambien), stimulants (e.g., Ritalin), steroids, and pain medicines (e.g., Percodan). Women met criteria for NMUPD by endorsing at least one instance of non-medical use of a prescription drug in the past year.

2.2.2. Health and mental health—Lifetime posttraumatic stress disorder (PTSD) and major depressive episode (MDE) were assessed with the National Women's Study (NWS) PTSD and MDE modules, structured interviews based on the *Diagnostic and Statistical Manual of Mental Disorders criteria* (Acierno, Resnick, Kilpatrick, Saunders, & Best, 1999; American Psychiatric Association, 1994; Ruggiero et al., 2004). Strong reliability and validity (Kilpatrick et al., 2003; Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993) have been documented for both measures. Functional impairment was also assessed as part of the PTSD and MDE modules.

Past year rating of general health was measured by asking women to rate their health in comparison to other people their own age. Response choices ranged from “poor” to “excellent.” Consistent with previous research responses were dichotomized: “poor/only fair” health or “excellent/very good/good” health. This assessment is consistent with previously validated single item measures of general subjective health, which have shown both good reliability and validity (Shetterly, Baxter, Mason, & Hamman, 1996).

2.2.3. Substance use—Four substance use outcomes were measured in this study: past year substance abuse, past year binge drinking, past year illicit drug use, and past year non-experimental marijuana use. Past year substance abuse was assessed using the substance use module from the NWS interview, approximating the criteria set forth by the DSMIV. These criteria were modified to include women meeting criteria for dependence, as well as abuse, and have been shown to have adequate face validity. These measures have also been associated with scores indicating higher mean number of heavy drinking days and higher mean number of days of reported intoxication (Kilpatrick, Acierno, Resnick, Saunders, & Best, 1997). Past year binge drinking was defined as consumption of five or more drinks of an alcoholic beverage with at least monthly frequency (at least 12 or more days within the past year), approximating the NIAAA definition for “binge drinking (NIAAA, 2004). Past year illicit drug use was defined as using at least one of the following drugs at least once in the past year: cocaine, crack, PCP, heroin, methadone, inhalants, ecstasy, GHB, Ketamine, Rohypnol, Methamphetamine, and LSD/hallucinogens. Finally, past year non-experimental marijuana use was defined as at four occasions of use in the past year of marijuana (see Kilpatrick et al., 2000 for more detail).

2.2.4. Rape experiences—We assessed women's most recent and/or only and, if applicable, first incident of rape. Rape was defined as penetration of the victim's vagina, mouth or rectum without consent. The key element of forcible rape (FR) was the perpetrator's use of force or threat of force. The key element of IR was that the victim perceived the perpetrator to have raped her when she was intoxicated and impaired via voluntary intake of drugs or alcohol by the victim. In contrast, the key element of DAFR was that the perpetrator was perceived by the victim as having deliberately attempted to produce incapacitation by administering drugs or alcohol to the victim. In both DAFR and

IR cases, the victim was unable to consent to sexual intercourse due to incapacitation (e.g., lack of consciousness/awareness or ability to control behavior). Questions were closed-ended and behaviorally specific.

Classification of individuals into rape categories was based on history of each type of rape; classification was non-mutually exclusive. Women's rape experience could be classified in multiple categories (i.e., IR, FR, or DAFR) based upon types of characteristics endorsed.

2.3. Procedure

Women were interviewed using a computer-assisted telephone interviewing (CATI) system. The CATI system is designed to reduce interviewer error in both data collection and data recording (United Nations-Economic and Social Commission for Asia and the Pacific (UN-ESCAP, 2001). Only experienced female interviewers were involved in survey procedures. Completed interviews averaged 20 min. This study was approved by the Institutional Review Board at a major medical university.

After determining that the residence contained one or more women eligible for the study, the interviewer introduced the study and provided a toll-free telephone number to confirm the authenticity of the study. After a complete description of the study was provided, oral consent was obtained. After determining that the residence contained one or more women eligible for the study, the interviewer introduced the study and provided a toll-free telephone number to confirm the authenticity of the study. When a residence had more than one woman who met study criteria, the woman with the most recent birthday was selected. Whenever possible, women were interviewed immediately after respondent selection was determined. Otherwise, appointments were scheduled or blind callbacks were made at different times of day and days of the week. A minimum of five callbacks was made before a case was abandoned. After a complete description of the study was provided, oral consent was obtained.

2.4. Analysis plan

Logistic regression analyses were conducted to identify variables within each predictor set: demographics (age, ethnicity and family income), health/mental health (self-reported health, lifetime PTSD and lifetime MDE), substance abuse (past year substance abuse, past year binge drinking, past year illicit drug use and past year marijuana use), and rape history (history of FR, history of IR, and history of DAFR) that were associated with NMUPD. Significant predictors emerging from these analyses were entered into a final multivariable logistic regression analysis predicting unique variance in NMUPD use over the past year.

3. Results

Sample characteristics are described in Table 1. Prevalence of NMUPD in this sample was 7.8% (n=155). Categories of prescription drug use are reported in Table 2.

3.1. Demographics

None of the demographic variables examined were associated with increased odds of ever misusing prescription drugs.

3.2. Health

Among the health/mental health variables, lifetime PTSD (OR=1.68 vs. no PTSD; 95% CI [1.09–2.58]) and MDE (OR=2.67 vs. no MDE; 95% CI [1.74–4.11]) were associated with prescription drug misuse. No other health variables were associated in this model (Table 3).

3.3. Substance abuse

All variables in this model were associated with increased odds of ever having misused prescription drugs. Past year substance abuse (OR=2.84 vs. none; 95% CI [1.91–4.22]), past year binge drinking (OR=1.64 vs. none; 95% CI [1.07–2.52]), past year illicit drug use (OR=5.06 vs. none; 95% CI [2.82–9.07]), and past year marijuana use (OR=2.98 vs. none; 95% CI [1.88–4.72]) were all significant predictors.

3.4. Rape types

Within the rape type model, history of IR (OR=3.16; 95% CI [1.71–5.84]) and history of DAFR (OR=3.08; 95% CI [1.45–6.55]) were associated with increased risk of NMUPD. FR was not a significant unique predictor.

3.5. Final model

Significant predictors from the individual models were entered into a final multivariable model (Table 4). Lifetime MDE remained a significant predictor (OR=2.14 vs. no MDE), while lifetime PTSD only maintained a trend toward significance (OR=1.59; $p=.06$ vs. no PTSD). All substance use variables also remained significant including past year substance abuse (OR=2.50 vs. none), past year binge drinking (OR=1.76 vs. none), past year illicit drug use (OR=4.90 vs. none), and past year marijuana use (OR=2.80 vs. none). Among the rape variables, both IR and DAFR lost significance in unique association with non-medical use of prescription drugs.

4. Discussion

4.1. Overview and integration of findings

This study builds on existing research examining correlates (i.e., demographics health/mental health, substance use, and rape history) of NMUPD in a college sample of 2000 women. We predicted that lifetime history of psychopathology, past year report of abuse of other substances, and lifetime rape experiences would be associated with increased likelihood of engagement in past year NMUPD.

In the initial models, as predicted, lifetime history of PTSD and MDE both were significantly associated with past year NMUPD. When entered into the final model, similar patterns emerged in the data. Relations between NMUPD and psychopathology found in this study are consistent with existing research and is consistent with the theory that NMUPD may be a form of self-medication for psychological distress (McCauley, Amstadter, et al., 2009; Wu, Pilowsky, & Patkar, 2008; Teter, Falone, Cranford, Boyd, & McCabe, 2010). In a sample of college students endorsing NMUPD, McCabe, Boyd, and Teter (2009) found that 39% identified self-medication as a reason for using, and another 48% reported both self-medication and recreational motivation for use. Additionally, Boyd, McCabe, and Teter

(2006) found that adolescents with MDE endorsed non-medical use of prescription pain killers primarily as a method of reducing pain, as opposed to getting high. In another study, college students reported that most frequent motivation for stimulant use was to improve concentration (Teter, McCabe, Cranford, Boyd, & Guthrie, 2005). This study did not assess mental health correlates of non-prescription use of stimulants; however, it may be important for future studies to investigate the possible relationship between college stimulant use and mental health disorders (e.g., depression, PTSD) that are associated with impaired concentration. Although sample size limited our ability to parse out the specific associations between psychological distress and specific classes of prescription drugs, our results provide initial support the negative reinforcement theory that NMUPD may serve to reduce distress associated with mental health disorders.

Consistent with our hypotheses, all substance abuse variables were significantly associated with past year NMUPD, with the use of other illegal drugs increasing a woman's risk for NMUPD nearly fivefold. These substance-related variables remained robust predictors in the final model, indicating a strong unique association with NMUPD. Our findings support extant research that other (i.e., non-prescription) substance use is strongly associated with NMUPD. For example, several researchers (Huang et al., 2006; McCabe, Cranford, & West, 2008) found that adults who endorsed NMUPD abuse and dependence were more likely to report an abuse/dependence diagnosis related to other substances (including alcohol and illicit drugs), compared with adults who did not endorse NMUPD disorders. In college samples (e.g., Ford & Arrastia, 2008; McCabe et al., 2007; McCabe, Cranford, & Boyd, 2006), binge drinking, marijuana use, and illicit substance use all have been associated with NMUPD. McCabe and colleagues (2007) proposed that college provides a ripe environment for substance use, including increased access to substances on campus, fostering cultural acceptability for substance use, and peer pressure. Our findings reinforce the concern that college students are at risk for multiple substance use, and lend further support for the need to develop new prevention and intervention programs, or expand existing programs, to target multiple classes of substances, including NMUPD.

Compared to college students without such histories, only IR and DAFR were uniquely associated with an increased risk for NMUPD in the initial model. Prior research also has found unique associations between substance use and IR and DAFR (McCauley, Ruggiero, et al., 2009). Given the significance of the associations between IR/DAFR and NMUPD in the initial models, the inclusion of substance use predictors may have absorbed variance that is shared with drug/alcohol-facilitated sexual assault. There may be an underlying association between general substance use and substance-related sexual assault, such that substance use is a risk factor for experiencing substance-related sexual assaults (McCauley, Amstadter, et al., 2009). Testa, Livingston, Vanzile-Tamsen, and Frone (2003) found that adolescent girls who had experienced an incapacitated rape, compared with adolescent girls who did not have a history of sexual assault, were over three times as likely to report alcohol and hard drug use before the age of 18 years. Building upon this finding, Testa, Vanzile-Tamsen, and Livingston (2007) demonstrated that at the two-year follow-up of a longitudinal study, baseline past year drug use predicted sexual victimization perpetrated by an intimate partner, and baseline past year heavy drinking predicted sexual victimization perpetrated by a non-intimate partner. Taken as a whole, research suggests that substance use, including NMUPD,

is associated with increased likelihood of sexual victimization, and more specifically, substance-facilitated sexual assault. Future research should examine potential mechanisms underlying this shared risk for substance use problems and IR/DAFR experiences among college women.

4.2. Limitations of the study

Although this study has notable strengths, there are several limitations. These data are cross-sectional and thus limit our ability to determine causality in this sample. Future longitudinal research is necessary to determine the temporal directionality among variables associated with NMUPD. Second, our sample size did not allow for statistical analyses of distinct classes of prescription drugs, such as stimulants vs. sedatives. Other researchers have suggested that there may be different motivators or risks associated with these categories (e.g., Ford & Arrastia, 2008); future studies should focus on identifying potential unique factors associated with different classes of prescription drugs, including self-medication. Our sample was limited to college women, and we focused on sexual assault as a homogenous traumatic experience. Future studies should expand upon our findings by including men and participants with other traumatic experiences.

In sum, our findings highlight the need for increased awareness of NMUPD on college campuses, especially among victims of sexual assault.

4.3. Conclusions and implications for intervention

Despite these limitations, the present results may inform programming efforts to prevent or treat NMUPD on college campuses. Research to date suggests that the majority of individuals who have problems related to NMUPD do not seek treatment (McCabe et al., 2008; Huang et al., 2006). Conversely, many universities currently offer primary and secondary prevention programs for binge drinking, marijuana use, sexual assault, and mental health problems, such as depression. Given this, the college environment may offer a unique opportunity for incorporating NMUPD screening, prevention, and treatment efforts into existing programs. Of particular importance, specific information about NMUPD should be disseminated within these prevention programs to help reduce the risk of NMUPD and related problems. College counselors and health care staff (e.g., campus primary care doctors), working with students also should be made aware of the prevalence of NMUPD within this population and utilize opportunities to address the issue of NMUPD when students present for other reasons, such as depression and substance-facilitated sexual assault. Similarly, when students endorse NMUPD, it is important to assess for the use of other substances and substance-facilitated sexual assault. Targeted assessment, prevention, and psychoeducation (e.g., about its potential link with interpersonal violence) among college students may ultimately assist in reducing risk for NMUPD and other forms of substance abuse among this at-risk population.

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Table 1
Frequencies for independent variables (N=2000)

Variable	N	% ^a
<i>Demographics</i>		
Age		
18–20	1428	71.4
21 and older	572	28.6
Caucasian		
No	500	25.0
Yes	1500	75.0
Income		
Up to \$60,000	802	45.0
>\$60,000	982	55.0
<i>Health</i>		
Self-rated health		
Poor/fair	86	4.3
Good/very good/excellent	1913	95.7
Lifetime PTSD		
No	1640	82.0
Yes	360	18.0
Lifetime MDE		
No	1679	84.0
Yes	321	16.0
<i>Substance abuse</i>		
Past year substance abuse		
No	1604	80.2
Yes	396	19.8
Past year binge drinking		
No	1649	84.3
Yes	307	15.7
Past year illicit drug use		
No	1921	96.1
Yes	78	3.9
Past year marijuana use		
No	1774	88.7
Yes	225	11.3
<i>Rape type</i>		
History of incapacitated rape		
No	1916	95.8
Yes	84	4.2
History of drug or alcohol facilitated rape		
No	1947	97.4

Variable	N	% ^a
Yes	53	2.6
History of forcible rape		
No	1826	91.3
Yes	174	8.7

^aValid percents are reported.

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Table 2
Frequencies for non-medical use of prescription drugs (N=2000)

Variable	N	%
Any non-medical use		
Yes	155	7.8
Tranquilizers		
Yes	45	2.3
Sedatives		
Yes	36	1.8
Stimulants		
Yes	70	3.5
Pain relievers		
Yes	71	3.6
Steroids		
Yes	1	0.1

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Table 3
Logistic regression results: non-medical use of prescription drugs

Predictor	OR	95% CI	p-value
<i>Model 1: demographics</i>			
Age			
18–20	1.00	–	NS
21 and older	1.29	0.90–1.87	
White/Non-Hispanic			
No	1.00	–	NS
Yes	1.53	0.98–2.41	
Income			
Up to \$60,000	1.00	–	NS
>\$60,000	1.13	0.79–1.61	
<i>Model 2: health</i>			
Self-rated health			
Poor/fair	1.00	–	NS
Good/very good/excellent	0.68	0.36–1.27	
Lifetime PTSD			
No	1.00	–	<.05
Yes	1.68	1.09–2.58	
Lifetime MDE			
No	1.00	–	<.001
Yes	2.67	1.74–4.11	
<i>Model 3: substance abuse</i>			
Past year substance abuse			
No	1.00	–	<.001
Yes	2.84	1.91–4.22	
Past year binge drinking			
No	1.00	–	.02
Yes	1.64	1.07–2.52	
Past year illicit drug use			
No	1.00	–	<.001
Yes	5.06	2.82–9.07	
Past year marijuana use			
No	1.00	–	<.001
Yes	2.98	1.88–4.72	
<i>Model 4: rape experiences</i>			
History of incapacitated rape			
No	1.00	–	<.001
Yes	3.16	1.71–5.84	
<i>History of drug–alcohol facilitated</i>			
Rape			

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Predictor	OR	95% CI	p-value
No	1.00	–	<.001
Yes	3.08	1.45–6.55	
History of forcible rape			
No	1.00	–	NS
Yes	0.97	0.53–1.77	

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Table 4
Logistic regression results: final model of non-medical use of prescription drugs

Predictor	OR	95% CI	p-value
Lifetime PTSD			
No	1.00	–	.06
Yes	1.59	0.98–2.60	
Lifetime depression			
No	1.00	–	<.01
Yes	2.14	1.31–3.49	
Past year substance abuse			
No	1.00	–	<.001
Yes	2.50	1.67–3.75	
Past year binge drinking			
No	1.00	–	<.01
Yes	1.76	1.14–2.72	
Past year illicit drug use			
No	1.00	–	<.001
Yes	4.90	2.70–8.89	
Past year marijuana use			
No	1.00	–	<.001
Yes	2.80	1.76–4.46	
History of incapacitated rape			
No	1.00	–	NS
Yes	1.11	0.56–2.18	
History of drug–alcohol facilitated rape			
No	1.00	–	NS
Yes	1.09	0.48–2.47	

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