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Mental Health and Rape History in Relation to Non-medical Use of Prescription Drugs in a National Sample of Women

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Abstract

The current study examined prevalence and correlates of non-medical use of prescription drugs (NMUPD), with particular emphasis on lifetime history of rape and PTSD as risk associates. Interviews conducted via telephone using Computer-Assisted Telephone Interviewing technology, resulting in a nationally representative sample of 3,001 non-institutionalized, civilian, English or Spanish speaking women (aged 18–86 years) residing in households with a telephone. Demographic characteristics, rape history, general health/mental health, and substance abuse variables were assessed. NMUPD was assessed by asking if, in the past year, participants had misused a prescription drug. Multivariable logistic regressions were conducted for each theoretically derived predictor set. Significant predictors from each set then entered into final multivariable logistic regression to determine significant predictors of past-year NMUPD. NMUPD was endorsed by 5.5% of the sample (n=164). Final multivariable model showed that lifetime posttraumatic stress disorder, other forms of substance use/abuse, and a history of drug or alcohol facilitated rape were significantly associated with increased likelihood of NMUPD. Risk reduction efforts targeting non-medical prescription drug use among women who have experienced traumatic events and/or abuse substances are warranted. Trauma-focused interventions for drug or alcohol facilitated rape victims should include treatment or prevention modules that specifically address NMUPD.

Keywords

Non-medical prescription drug use; Rape; PTSD; Substance use; Drug-alcohol facilitated rape

1. Introduction

1.1 Overview

Over 14 million individuals and 5.6% of all females in the U.S. reported past-year non-medical use of prescription drugs (NMUPD) according to data from the 2006 National Household Survey on Drug Abuse (NSDUH; SAMHSA, 2007), which has heightened awareness of NMUPD as a notable public health concern. NMUPD 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 feeling it caused (SAMHSA, 2002). Rates of both past-year NMUPD and prescription drug use disorders have steadily increased in the past decade, rising by more than 50% from 1991 to 2001 [Blanco et al., 2007; Compton & Volkow, 2006; Zacny et al., 2003]. Given the continuing rise in NMUPD, proper identification of populations at risk for misuse has been identified as an essential next step in research on NMUPD (Compton & Volkow,

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2006). To date, relatively little is known about whether rape experiences and mental health outcomes commonly associated with rape experiences are associated with NMUPD among women.

1.2 Risk Associates of NMUPD

Several factors associated with NMUPD have been consistently identified by previous research. Young age (approximately 18–25 years) and Caucasian ethnicity emerge as demographic associates of NMUPD (Grant, 1996; Herman-Stahl, Krebs, Kroutil, & Heller, 2007; McCabe, Cranford, & Boyd, 2006). Abuse/dependence on other substances, including alcohol use disorders, nicotine dependence, illicit drug use, and marijuana use typically emerge among the strongest risk associates of NMUPD (Huang et al., 2006; Simoni-Wastilia, Ritter, & Strickler, 2004; Tetrault et al., 2007). Finally, psychiatric conditions (e.g., major depression, anxiety disorders, such as social phobia and panic) and poor self-rated general health increase odds of NMUPD and non-medical prescription drug use disorders (Blanco et al., 2007; Huang et al., 2006; Conway, Compton, Stinson, & Grant, 2006). Representative data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) indicate that the presence of panic disorder, social phobia, specific phobia, generalized anxiety, and depression are associated with significantly increased odds of lifetime non-medical prescription drug use disorder (Huang et al., 2006). However, given the well documented association between posttraumatic stress disorder (PTSD) and other forms of substance use/abuse, a notable omission in the extant literature is the investigation of the association between PTSD and NMUPD (e.g., Chilcoat & Breslau, 1998).

1.3 Interpersonal Violence and NMUPD

Little is known about the association between prescription drugs and interpersonal violence. The National Violence Against Women survey assessed lifetime exposure to potentially traumatic events (including physical assault, stalking, sexual assault, and multiple forms of victimization) and past month prescription drug use (limited to analgesics, sedatives, and/or antidepressants) in a sample of 8,000 men and 8,000 women aged 18 and older (Kubiak, Arfken, Boyd, & Cortina, 2006). Increases among all forms of prescription drug use was associated with increased severity of assault history, with multiple assault victims being the most likely to have used these prescription drugs in the past month. However, this study did not differentiate or specifically examine non-medical use of prescription drugs, which is distinct from appropriate use of prescribed drugs or medications.

Limited data speak to the association between experiences of interpersonal violence, such as lifetime rape (experienced by approximately 18% of U.S. women) and NMUPD (Kilpatrick, Resnick, Ruggiero, Conoscenti, & McCauley, 2007). However, a large body of research supports the association between rape experiences and subsequently increased levels of substance use and abuse (Kilpatrick et al., 2000). Rape experiences have been associated with increased levels of alcohol use, marijuana use, illicit drug use, and increases in appropriate use of prescription drugs (Acierno, 2003; Kilpatrick, Acierno, Resnick, Saunders, & Best, 1997; Resnick, Acierno, & Kilpatrick, 1997).

1.4 Rape Experiences and Substance Use

The association between rape and use of various substances has also recently been examined more proximally, with victim incapacitation at time of assault distinguishing potentially distinct categories of rape experience (Kilpatrick et al., 2007). Incapacitated rape (IR; rape by means of the victim's self-induced intoxication) and drug-alcohol facilitated rape (DAFR; rape by means of the perpetrator's deliberate intoxication of the victim) experiences account for over one-quarter (27.7%) of all rapes experienced by American women. IR and DAFR also appear to be more strongly associated with victim substance use than their counterpart, forcible

rape (FR; rape by use of physical force or threat of force). Victims of IR/DAFR are more likely than FR victims to report substance abuse, higher levels of alcohol use and binge drinking, and more negative consequences related to substance use (Kaysen, Neighbors, Martell, Fossos, & Larimer, 2006; Kilpatrick et al., 2007).

The self-medication hypothesis has been posited as one mechanism at least partially accounting for the relation between traumatic events such as rape, and subsequent use of substances like alcohol (Brady & Randall, 1999; Stewart & Conrod, 2003). In this model, the psychoactive effects of substances are thought to numb the increased psychological distress often experienced post-rape (Levenson, Oyama, & Meek, 1987). As a result, substance use is then negatively reinforced in victims of rape, making substance use more rewarding and contributing to increased use (Miranda, Meyerson, Long, Marx, & Simpson, 2002). Currently, no direct support exists for the extension of the self-medication hypothesis to the association between rape and NMUPD. However, Sturza and Campbell assessed prescription drug use (specifically sedative and antidepressant use) in a sample of 102 sexually assaulted community women and found that 44% of these women reported use of sedatives and/or antidepressants post-rape (Sturza & Campbell, 2005). Of women using prescription drugs, 14% reported obtaining these drugs through illicit means, half of whom indicated that they did not seek qualified medical care in order to avoid disclosing their assault. Qualitative data from this study also indicate that a majority of the women perceived their use of these medications as helping them “deal with their rape experience.”

1.5 Current Aims

The literature provides evidence supporting an association between rape experiences and subsequent substance use among women and speaks to the growing concern over NMUPD in this population, warranting an extension of research to include the potential association between rape experiences and NMUPD. The current study utilized a nationally representative sample of community women and extends the current literature on correlates of NMUPD. We specifically chose to address these associations among women due to their high risk for rape (approximately 86% of rape victims are female; Tjaden & Thoennes, 2006). In addition to including previously established associates of NMUPD (i.e., demographics, health/mental health, substance abuse), the current study also examined rape history (distinguishing between rape tactics of FR, IR, and DAFR) and lifetime mental health problems as contributors to risk for past-year NMUPD. We hypothesized that both lifetime PTSD and lifetime rape experiences, specifically IR and DAFR, would be associated with significantly increased odds for NMUPD.

2. Method

2.1 Participants

Data from this study came from the “National Women’s Study-Replication.” The sample of 3,001 women was formed from two U.S. population samples: a national cross-section of 2,001 women aged 18–34 years plus a national cross-section of 1,000 women aged 35 and older. Weights were created and used for all analyses with this sample to maximize representativeness by bringing the distribution of sample demographics in line with 2005 U.S. Census figures. The resulting sample consisted of 3,001 women (aged 18 to 86 years), with a mean age of 46.58 ± 17.87 .

We used random-digit-dial (RDD) methodology involving three steps. First, the sample was geographically stratified with sample allocation proportionate to population distribution. Second, a sample of assigned telephone banks was randomly selected from an enumeration of the Working Residential Hundreds Block (defined as each block of 100 potential telephone

numbers with an exchange that includes one or more residential listings) within the active telephone exchanges within the strata. Third, a two-digit number was randomly generated by computer for each Working Residential Hundreds Block. All interviews were conducted between January 23 and June 26, 2006.

2.2 Measures¹

2.2.1 Non-medical Use of Prescription Drugs (NMUPD)—To assess non-medical use of prescription drugs, women were given the following information in a preamble:

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.”

Participants were then asked about past year non-medical use of various prescription drugs. These drugs included: tranquilizers (e.g., Valium), sedatives (e.g., Ambien), stimulants (e.g., Ritalin), steroids, and pain medicines (e.g., Percodan). For each medication, women were asked, “In the past year, have you ever taken “on your own” or non-medically (drug category) like (trade name of drugs in that category)?” Women met criteria for NMUPD by endorsing yes to any one of these questions, indicating at least one instance of non-medical use of a prescription drug in the past year.

2.2.2 Health and Mental Health

PTSD and major depressive episode (MDE) were assessed with the National Women’s Study (NWS) PTSD and major depressive episode modules, structured interviews based on *Diagnostic and Statistical Manual of Mental Disorders* (DSM IV-TR, APA) criteria (Acierno, Resnick, Kilpatrick, Saunders, & Best, 1999; Ruggiero et al., 2004). Research on the NWS-PTSD has provided support for concurrent validity and several forms of reliability (e.g., temporal stability, internal consistency, diagnostic reliability) (Kilpatrick et al., 2003; Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993). The MDE module assesses hallmark symptoms of depression, including persistent feelings of sadness as well as loss of interest or pleasure. Support for internal consistency and convergent validity exist (Kilpatrick et al., 2003). Functional impairment was also assessed as part of the PTSD and MDE modules. Women reporting both lifetime PTSD and lifetime MDE were identified as having had multiple lifetime diagnoses.

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 (Becker, Sullivan, Tetrault, Desai, Fiellin, 2008; Shetterly, Baxter, Mason, & Hammerman, 1996).

2.2.3 Substance Use—Four additional forms of substance use were measured in this study: past-year substance abuse, past year binge drinking, past year illicit drug use, and past year marijuana use. Past year substance abuse was assessed using the substance use module from the NWS interview, approximating the criteria set forth by the DSM-IV. These criteria were modified to include women meeting criteria for dependence, as well as abuse, and have been shown to have adequate face validity. This measure has been associated with scores indicating

¹Interview measures are available upon request.

higher mean number of heavy drinking days and higher mean number of days of reported intoxication (Kilpatrick et al., 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). To assess binge drinking, women were asked to estimate the number of days in the past 12 months that they consumed five or more drinks of alcoholic beverages. 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, phencyclidine, heroin, methadone, inhalants, ecstasy, gamma hydroxybutyrate, Ketamine, Rohypnol, Methamphetamine, and lysergic acid diethylamide/hallucinogens. This list of illicit drugs of abuse was derived from the substance abuse disorders module of the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1997). Finally, past year marijuana use was defined as report of at least one time use in the past year of marijuana.

2.2.4 Rape Experiences—We assessed women's most recent/only incident of rape; multiply victimized women were also asked about their first incident. Questions were closed-ended and behaviorally specific (i.e. it was not necessary that women label their experience as "rape"). Questions were as follows:

Has a man or boy ever made you have sex by using force or threatening to harm you or someone close to you? Just so there is no mistake, by having sex, we mean putting a penis in your vagina.

Has anyone, male or female, ever made you have oral sex by force or threatening to harm you? So there is no mistake, by oral sex, we mean that man or boy put his penis in your mouth or someone penetrated your vagina or anus with their mouth or tongue?

Has anyone ever made you have anal sex by force or threatening to harm you? By anal sex we mean putting their penis in your anus or rectum.

Has anyone ever put fingers or objects in your vagina or anus against your will by using force or threatening to harm you?

Has anyone ever had sex with you when you didn't want to after you drank so much alcohol that you were very high, drunk, or passed out? By having sex, we mean that a man or boy put his penis in your vagina, anus, or your mouth?

Has anyone ever had sex with you when you didn't want to after they gave you, or you had taken enough drugs to make you very high, intoxicated, or passed out? By having sex we mean that a man or boy put his penis in your vagina, anus, or your mouth?

Women endorsing a rape experience were then asked follow-up questions to distinguish between IR and DAFR characteristics:

When this happened, did the incident involve only alcohol use on our part, only drug use on your part, or some use of both alcohol and drugs?

When this incident happened, did you drink the alcohol (take the drugs) because you wanted to, did the person(s) who had sex with you deliberately try to get you drunk, or both?

When this incident happened were you passed out from drinking or taking drugs?

When this incident happened were you awake but too drunk or high to know what you were doing or control your behavior?

Women qualified for *history of forcible rape (FR)* if they reported an experience of perpetrator use of force or threat of force. A woman qualified for *history of incapacitated rape (IR)* if she

perceived that the perpetrator had raped her when she was intoxicated and/or impaired via voluntary intake of drugs or alcohol. Women reporting a *history of drug/alcohol facilitated rape (DAFR)* reported that the perpetrator 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 due to incapacitation due to substances (e.g., lack of consciousness, or lack awareness or ability to control behavior).

Classification of individuals into rape categories was based on history of each type of rape; classification was non-mutually exclusive. For example, women who reported a history of forcible rape as their most recent or only incident but also reported a “first incident” that met criteria for DAFR were considered to have a history of both FR and DAFR. Women who reported elements of multiple tactics involved in a given incident were considered to have experienced each rape tactic that they 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. Only experienced female interviewers were involved in survey procedures. All interviews were conducted with English-speaking women. Completed interviews averaged 20 minutes. 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 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 were made before a case was abandoned. After a complete description of the study was provided, oral consent was obtained.

2.4 Statistical Analyses

Descriptive statistics and correlation analyses were conducted on all variables. Logistic regression analyses were conducted to identify variables within each predictor set: demographics (age, education, ethnicity, marital status, income), health/mental health (self-reported health, lifetime PTSD, lifetime MDE, lifetime PTSD and MDE), substance abuse (past year binge drinking, past year substance abuse, past year marijuana use, past year illicit drug use), and rape history (history of FR, history of IR, history of DAFR, number of rapes) that were associated with NMUPD. Significant predictors emerging from these analyses were entered into a final multivariable logistic regression analysis predicting NMUPD. SUDAAN (version 9.0) was used for all regression analyses to account for complex survey design and sample weighting. Alpha was set at .05 to determine significance and 95% confidence intervals (CI) are reported.

3. Results

The overall cooperation rate (i.e., [completes+ screen-outs] divided by [completes + screenouts + eligible refusals, break-off interviews, partial interviews]) was 65.3%. Sample characteristics are described in Table 1. Prevalence of past year NMUPD in this sample was 5.5% (n=164), equating to a population estimate of 6,235,664 U.S. women (Table 2). Given that we lacked sufficient power to conduct separate analyses for non-medical use of each category of prescription drug, we examined any past year NMUPD as our outcome. As shown in Table 3,

NMUPD was significantly correlated inversely with age, marital status, and health status. NMUPD was positively associated with PTSD, MDE, and all substance use variables, as well as with all rape history variables. To examine these variables in the context of shared variance, regression analyses for theoretically derived predictor sets were conducted (Table 4).

3.1 Demographics

We assessed five demographic variables: age (18–34, 35–54, 55 and older), education, race, marital status (married vs. not married), and income (less than \$20,000/year, \$20,000–\$60,000/year, greater than \$60,000/year). Racial status was dichotomous (white vs. minority), with minority status including individuals endorsing Black, Hispanic, Asian, Native American, or Pacific Islander as their race. The only significant demographic variable that was associated with increased odds of past-year NMUPD was age; individuals aged 18–34 were more likely than the individuals aged 55 and older to report NMUPD (Odds Ratio [OR] =4.63, CI=1.45–14.85). Participants in the middle age category, 35–54, were not at greater risk than their older counterparts of reporting NMUPD.

3.2 Health

Among the health/mental health variables, lifetime PTSD (OR=2.41, CI=1.40–4.15) was associated with past year NMUPD. No other health variables were associated in this model.

3.3 Substance Abuse

All variables in this model were associated with increased odds of past year NMUPD. Past year substance abuse (OR=3.21, CI=1.95–5.29), past year binge drinking (OR=1.99, CI=1.10–3.59), past year illicit drug use (OR=8.13, CI=3.50–18.88), and past year marijuana use (OR=3.94, CI=2.18–7.14) were all significant correlates.

3.4 Rape Types

Within the rape type model, history of IR (OR=2.93, CI=1.79–4.82) and history of DAFR (OR=4.26, CI=2.43–7.47) were both associated with increased risk of NMUPD. FR and number of rapes were not significant correlates of past year NMUPD. To further understand the relationship between rape history and NMUPD, descriptive statistics were conducted by rape history. Among women with a history of DAFR, 20% report past year NMUPD, among women with a history of IR, 26.1% reported past year NMUPD, and among women with a history of FR, 9.9% endorsed past year NMUPD.

3.5 Final Model

Significant statistical predictors from the individual models were entered into a final multivariable model (see Table 5). Age was associated with NMUPD, in that participants aged 18–34 were more likely than the reference group (ages 55 and older) to report past-year NMUPD (OR=2.30, CI=0.72–7.39). The middle age category, ages 35–54, were not at any higher risk than individuals ages 55 and older. Lifetime PTSD remained a significant health correlate of NMUPD (OR=2.61, CI=1.75–3.89). All substance use variables also remained significant in the final model: past year substance abuse (OR=2.27, CI=1.42–3.64), past year binge drinking (OR=1.79, CI=1.01–3.17), past year illicit drug use (OR=5.91, CI=2.69–12.97), and past year marijuana use (OR=3.02, CI=1.67–5.46). Among the rape variables, only history of drug or alcohol facilitated rape (OR=2.92, CI=1.57–5.40) remained significantly associated with increased odds of NMUPD.

4. Discussion

4.1 Overview of Findings

Whereas a growing body of research examines the correlates of NMUPD, with focus on demographic and mental health variables, little is known about the role of rape history or PTSD in relation to NMUPD. Overall prevalence of NMUPD as measured in this study (5.5%) was similar to that reported by 2006 NSDUH data for adult females (5.6%; SAMHSA, 2007). This is the first study to our knowledge to examine rape type and PTSD, along with previously established risk correlates, in association with NMUPD in an epidemiological nationally representative community sample of women. Several notable findings emerged. First, PTSD was associated with increased odds of NMUPD, while MDE was not, suggesting that traumatic stress symptoms play a role in the women's non-medical use of prescription drugs. Second, only certain types of rape history were associated with NMUPD. Specifically, DAFR was the only rape type uniquely associated with increased risk of NMUPD; which was not related to FR and IR, or to the cumulative effect of multiple rapes. Third, most forms of substance use/abuse also increased risk of NMUPD, with illicit drug use being the most strongly associated with report of NMUPD.

Consistent with literature supporting an empirical link between trauma/PTSD and use of other substances, lifetime PTSD was associated with past year NMUPD (Brady, Back, & Coffey, 2004). However, given the previous support for MDE and self-rated general health as independent risk factors for NMUPD, it is interesting that PTSD emerged as the sole health/mental health predictor. Women from other community samples have reported using illicit drugs as a method of coping with PTSD symptoms (e.g., hypervigilance, re-experiencing) (Sullivan & Holt, 2008). Thus, it is plausible that the anxiety-reducing effects produced by several classes of the prescription drugs may be particularly attractive to women experiencing significant PTSD symptoms (Chilcoat & Breslau, 1998). As with other models of substance abuse, it is proposed that if a woman takes a prescription drug, prescribed to her or not, and she views the drug as reducing adverse PTSD symptoms, her behavior of taking the drug is reinforced and she is likely to take the drug the future when she experiences the adverse PTSD symptoms again. Further, women experiencing PTSD symptoms may be less likely to speak with a medical professional about their symptoms due to concerns over stigmatization associated with their traumatic event history (Sturza & Campbell, 2005), and therefore more likely to seek out prescription drugs, in lieu of the actual prescription. However, one limitation of the current study is that we did not have sufficient power to examine each class of prescription drugs separately. Therefore, while we would expect this hypothesis to be more relevant for sedatives, tranquilizers, and pain killers (together comprising the majority of NMUPD in our sample), we are unable to speak to differences by drug type with the current data. Future research should explore these and other specific interpretations of the PTSD-NMUPD association to understand the clinical connection better and to inform interventions.

Also consistent with previous research, in our demographic model younger members (18–34 years) of our sample were at elevated risk for NMUPD (however, it should be noted that when controlling for other factors in our final model age remained a significant predictor overall but no differences between age categories were significant). Rape risk has also been shown to be elevated among this population of young adult women (Acierno et al., 2001). The existing literature on DAFR as a distinct form of rape is presently somewhat limited. History of IR/DAFR has been associated with increased likelihood of a high-risk lifestyle that involves the use of alcohol and other substances, both concurrent to the time of assault and subsequent to the assault (Kaysen et al., 2006; Mohler-Kuo, Dowdall, Koss, & Wechsler, 2004). Likewise, NMUPD was most strongly associated with other forms of substance abuse in the current study. Because our data cannot speak to the temporality of the relation between DAFR and NMUPD, we cannot rule out in some cases that past-year NMUPD is an artifact of longstanding NMUPD

that preceded and perhaps increased women's risk for DAFR. Consistent with this hypothesis, previous research has noted that in a notable portion of DAFR cases, victims toxicology reports are positive for prescription drugs (e.g., Hindmarch, Elsohly, Gambles, & Salamone, 2001; Scott-Ham & Burton, 2005). Additionally, NMUPD and other forms of substance abuse may increase women's contact with potential perpetrators who also have access to prescription and illicit drugs, thereby placing them at greater risk for DAFR. Future prospective research would be helpful in delineating not only the temporality of the association between DAFR and NMUPD, but also in investigating contextual factors of DAFR incidents specifically that may strengthen its association with NMUPD.

4.2 Implications

Although preliminary in nature, these findings have implications for future research leading to the identification of at-risk populations and design of interventions aimed at improving population health. Future research should extend the current epidemiological findings to investigate relations between PTSD, history of DAFR, and non-medical prescription drug abuse/dependence in both community and clinical samples. The current findings suggest that medical or clinical services targeted at female DAFR victims should incorporate psychoeducation regarding the misuse of prescription drugs and alternatives for coping with PTSD in a healthy manner. Second, increased risk for NMUPD among DAFR victims should be considered in conjunction with previous data suggesting such women may use these substances to help cope with their rape experiences, but do not seek medical services to avoid disclosing about the rape (Sturza & Campbell, 2005). Additional research is needed in order to more clearly identify women at highest risk for abuse of or dependence on prescription medications. This line of research would also be strengthened by research on methods of obtaining, and reasons for using, prescription drugs. Increased regular screening regarding both substance abuse history and sexual assault history, particularly DAFR, may facilitate patient disclosure and assist physicians in both detecting legitimate need for prescription medication and in identifying women who may be at risk for non-medical use of these prescription medications.

4.3 Limitations of the Current Study

The current study offers unique information regarding trauma-related risk factors for NMUPD among a nationally representative sample of women. Nonetheless, limitations of this investigation should be noted. The use of telephone interviews also serves as a potential limitation, as women who resided in homes without telephones, institutionalized women, and homeless women were not able to be recruited into the study. However, it should be noted that relatively few women comprise these excluded female populations. Potential recall biases associated with retrospective, self-report methodology may have impacted participants' reports (e.g., underreporting of more distal events/behaviors), and future research in this area should consider employing timeline follow-back methodology to assess substance use. As noted above, the cross-sectional design of the investigation and brevity of the interview due to budget limitations prohibited the careful study of the temporal relation between DAFR and NMUPD. Our necessarily brief assessment of NMUPD also did not include assessment of history of medical care and appropriate use of prescription medications. Also, we are unable to distinguish between different types of NMUPD, such as respondents using their own prescribed medications for self-treatment or individuals who were using someone else's prescription drugs without a prescription to experience the drug's effects. The differences between these types of NMUPD have important clinical implications which cannot be addressed by this study and should be investigated in future research. In addition to larger studies distinguishing between types of NMUPD, it would be prudent for studies with a larger sample size to employ split-half reliability testing to further validate study findings. Additionally, the current study cannot speak to how our assessment of NMUPD on one past year occasion relates to NMUPD abuse

and/or dependence. The authors see this as an important next step in further elucidating relations between NMUPD, PTSD, and trauma history. Similarly, measures of PTSD and MDE, while approximating DSM-IV criteria for diagnosis, were not formal clinical diagnoses. Finally, men and non-English speaking women were not included in the current investigation, limiting the conclusions drawn from these data to U.S. women who speak English, and highlighting the need for parallel investigations in male and non-English speaking minority populations.

4.4 Conclusions

Overall, these results represent an important advance in the study of prescription drug use. Lifetime history of DAFR, PTSD, and other forms of substance abuse were identified as factors significantly associated with NMUPD and should be assessed by medical professionals prior to selection of treatment options. Frontline care providers should work with recent rape victims with the goal of increasing the likelihood that women with significant clinical symptoms will seek professional care by educating them regarding the symptoms of PTSD and available efficacious treatment options.

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Table 1
Frequencies for Independent Variables (N=3,001 women)

Variable	N	%
Demographics		
Age		
18–34	879	29.3
35–54	1132	37.8
55 and older	985	32.9
Education		
Up to some high school	249	8.3
High school grad-Some college	1746	58.2
College graduate	603	20.1
Some grad school-Graduate degree	402	13.4
Caucasian		
No	653	21.8
Yes	2348	78.2
Married		
No	1320	44.0
Yes	1681	56.0
Income		
<\$20,000	591	21.6
\$20,000–\$60,000	1144	41.8
>\$60,000	1004	36.6
Health		
Self-rated Health		
Poor/Fair	341	11.4
Good/Very Good/Excellent	2650	88.6
Lifetime Posttraumatic Stress Disorder (PTSD)		
No	2494	83.2
Yes	505	16.8
Lifetime Major Depression (MDE)		
No	2618	87.2
Yes	383	12.8
Combined Lifetime PTSD and MDE		
No	2734	91.1
Yes	267	8.9
Substance Abuse		
Past Year Substance Abuse		
No	2798	93.3
Yes	202	6.7
Past Year Binge Drinking		
No	2823	95.7
Yes	127	4.3
Past Year Illicit Drug Use		

Variable	N	%
No	2946	98.2
Yes	54	1.8
Past Year Marijuana Use		
No	2881	96.1
Yes	118	3.9
Rape Type		
History of Incapacitated Rape		
No	2910	97.0
Yes	91	3.0
History of Drug or Alcohol Facilitated Rape		
No	2932	97.7
Yes	69	2.3
History of Forcible Rape		
No	2518	83.9
Yes	483	16.1
Number of Rape(s)		
None	2445	81.5
Single Incident	276	9.2
Multiple Incidents	280	9.3

Table 2
Frequencies for past year (2005–2006) non-medical use of prescription drugs
(N=3,001 women)

Variable	N	%	population estimates *
Any Non-medical Use **			
Yes	164	5.5	6,235,664
Tranquilizers			
Yes	62	2.1	2,380,512
Sedatives			
Yes	35	1.2	1,360,508
Stimulants			
Yes	50	1.7	1,927,387
Pain Relievers			
Yes	79	2.6	2,947,769
Steroids			
Yes	3	0.1	113,376

* population estimates based on 2006 U.S. Census estimates

** Individuals could report non-medical use of multiple categories of drugs. Therefore, categories do not sum to equal “any non-medical use” total.

Table 3

Correlation matrix for independent and dependent variables (N=3,001).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Any Non-Medical Use																
2. Age	-.14***															
3. Caucasian	.06	.17***														
4. Education	.38	-.02	.12***													
5. Married	-.04*	.05***	.15***	.10***												
6. Income	.75	-.03	.14***	.37***	.44***											
7. Self-rated Health	-.06**	.09	0.12***	.13***	.11***	.20***										
8. Lifetime Posttraumatic Stress Disorder (PTSD)	.17***	-.14***	-.03	-.07***	-.09***	-.12***	-.22***									
9. Lifetime Major Depression (MDE)	.16***	-.14***	-.03	-.05**	-.12***	-.11***	-.21***	.54***								
10. Combined Lifetime PTSD & MDE	.19***	-.13***	-.04	-.08***	-.11***	-.12***	-.23***	.70***	.82***							
11. Past Year Binge Drinking	.14***	-.11***	.00	-.02	-.09***	-.01	-.04*	.07***	.08***	.10***						
12. Past Year Substance Abuse	.24***	-.18***	-.01	.01	-.09***	-.01	-.07***	.15***	.19***	.17***	.27***					
13. Past Year Illicit Drug Use	.34***	-.12***	-.04*	-.04*	-.08***	-.04*	-.07***	.12***	.14***	.16***	.14***	.30***				
14. Past Year Marijuana Use	.29***	-.17***	-.03*	-.03	-.12***	-.06**	-.07***	.11***	.14***	.15***	.19***	.30***	.45***			
15. History of Incapacitated Rape	.11***	-.13***	.01	.00	-.04*	-.03	-.03	.11***	.12***	.12***	.10***	.11***	.16***	.13***		
16. History of Drug-Alcohol Facilitated Rape	.14***	-.10***	-.03	-.02	-.04*	.00	-.06**	.12***	.09***	.10***	.04*	.07***	.13***	.11***	.10***	
17. History of Forcible Rape	.09***	-.08***	-.04*	-.06**	-.06**	-.09***	-.16***	.27***	.27***	.25***	.02**	.05**	.09***	.08***	.22***	.20***
18. Number of Rape(s)	.10***	-.90***	-.04**	-.07***	-.07***	-.06**	-.15***	.25***	.27***	.25***	.08***	.10***	.14***	.13***	.29***	.25***

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 4
Logistic Regression Results: Individual predictor set models of non-medical use of prescription drugs with odds ratio (OR), confidence interval (CI), and significance provided

Predictor	OR	95% CI	p-value
Model 1: Demographics (N=2735)			
Age			
18–34	4.63	1.45–14.85	<.001
35–54	2.15	0.58–8.01	
55 and older	1.00	-	
Education			
Up to some high school	1.00	-	.07
High school grad-Some college	0.49	0.23–1.05	
College graduate	0.35	0.16–0.79	
Some grad school-Graduate degree	0.61	0.21–1.77	
Caucasian			
No	1.00	-	.82
Yes	0.95	0.61–1.49	
Married			
No	1.39	0.88–2.17	.15
Yes	1.00	-	
Income			
<\$20,000	1.00	-	.23
\$20,000–\$60,000	1.44	0.86–2.41	
>\$60,000	1.60	0.91–2.81	
Model 2: Health (N=2989)			
Self-rated Health			
Poor/Fair	1.17	0.74–1.86	.49
Good/Very Good/Excellent	1.00	-	
Lifetime Posttraumatic Stress Disorder (PTSD)			
No	1.00	-	<.01
Yes	2.41	1.40–4.15	
Lifetime Major Depression (MDE)			
No	1.00	-	.56
Yes	1.27	0.57–2.80	
Combined Lifetime PTSD and MDE			
No	1.00	-	.15
Yes	2.00	0.77–5.18	
Model 3: Substance Abuse (N=2950)			
Past Year Substance Abuse			
No	1.00	-	<.001
Yes	3.21	1.95–5.29	
Past Year Binge Drinking			
No	1.00	-	.02

Predictor	OR	95% CI	p-value
Yes	1.99	1.10–3.59	
Past Year Illicit Drug Use			
No	1.00	-	<.001
Yes	8.13	3.50–18.88	
Past Year Marijuana Use			
No	1.00	-	<.001
Yes	3.94	2.18–7.14	
Model 4: Rape Types (N=3000)			
History of Incapacitated Rape			
No	1.00	-	<.001
Yes	2.93	1.79–4.82	
History of Drug-Alcohol Facilitated Rape			
No	1.00	-	<.001
Yes	4.26	2.43–7.47	
History of Forcible Rape			
No	1.00	-	.57
Yes	1.18	0.67–2.08	
Number of Rape(s)			
None	1.00	-	.44
Single Incident	1.34	0.72–2.50	
Multiple Incidents	1.58	0.78–3.20	

Note: *p*-values listed indicate reflect the omnibus test for each variable, whereas individual CIs refer to each level of a variable.

Table 5
 Logistic Regression Results: Final model of non-medical use of prescription drugs with odds ratio (OR), confidence interval (CI), and significance provided (N=2944)

Predictor	OR	95% CI	p-value
Age			
18–34	2.30	0.72–7.39	.01
35–54	1.33	0.40–4.49	
55 and older	1.00	-	
Lifetime Posttraumatic Stress Disorder			
No	1.00	-	<.001
Yes	2.61	1.75–3.89	
Past Year Substance Abuse			
No	1.00	-	<.001
Yes	2.27	1.42–3.64	
Past Year Binge Drinking			
No	1.00	-	<.05
Yes	1.79	1.01–3.17	
Past Year Illicit Drug Use			
No	1.00	-	<.001
Yes	5.91	2.69–12.97	
Past Year Marijuana Use			
No	1.00	-	<.001
Yes	3.02	1.67–5.46	
History of Incapacitated Rape			
No	1.00	-	.28
Yes	1.36	0.78–2.36	
History of Drug-Alcohol Facilitated Rape			
No	1.00	-	<.001
Yes	2.92	1.57–5.40	

Note: *p*-values listed indicate reflect the omnibus test for each variable, whereas individual CIs refer to each level of a variable.