Published in final edited form as:

J Addict Dis. 2011 ; 30(3): 203–215. doi:10.1080/10550887.2011.581984.

Prevalence and correlates of prescription drug misuse among young, low-income women receiving public healthcare

Abbey B. Berenson, MD, MMS and Mahbubur Rahman, MBBS, PhD, MPH

Department of Obstetrics and Gynecology and Center for Interdisciplinary Research in Women's Health, The University of Texas Medical Branch, Galveston, Texas 77555-0587

Abstract

The purpose of this study was to examine the prevalence and correlates of prescription drug misuse among young, low-income women seeking care at a public clinic in Texas. Collected data on 2976 women included frequency of use, demographic and reproductive characteristics, religiosity, smoking history, concurrent substance use, depressive symptoms, perceived stress, health beliefs, and exposure to traumatic events. Overall, 30% reported ever misusing a prescription drug; 15% reported misuse in the past year. Women who initiated sexual intercourse at <15 yo, used illicit drugs, and smoked everyday were more likely to have misused prescription drugs. Higher trauma, stress, and posttraumatic stress scores also were associated with ever misusing prescription drugs. This study adds to limited data available on medication misuse by young women with few resources and demonstrates needs for prevention efforts in public clinics.

Introduction

The prevalence of nonmedical use of prescription drugs in the US has risen dramatically over the past decade.^{1–4} This trend has been substantiated by epidemiologic data from multiple federal sources, including the 2009 National Survey on Drug Use and Health (NSDUH), which ranked illicit use of psychotherapeutics during the past month second only to the marijuana use in the US.⁵ While declines were observed in the use of both alcohol and cocaine among those 18–22 years of age, there was an increase in the use of opioid pain relievers among this age group. The highest rates of nonmedical use of prescription drugs was observed among those 18–25 years of age, followed by adolescents between 12 and 17 years old.

An increase in nonmedical use of prescription drugs by adolescents and young adults has also been reflected in reports of emergency department (ED) visits, hospitalizations, and overdose deaths. For example, the Nationwide Inpatient Sample reported that hospitalizations resulting from overdoses of prescription psychotherapeutics increased 65% between 1999 and 2006, which was double the increase due to other drugs. Patients treated for these overdoses were more likely to be women.⁶ Mortality data from the CDC's National Vital Statistics System indicated that during the first 5 years of this same period, overdose deaths from illicit and prescription drugs rose 62.5%.⁷ The largest increases were noted among persons 15–24 years of age (113.3%) and white females (13.6%). The increase among females was twice that observed among males. The substantial increases were attributed to the growing number of deaths associated with prescription opioid analgesics, such as oxycodone. Opioid analgesics accounted for almost 40% of all poisoning deaths in 2006, up from 20% in 1999.⁸ In fact, opioids were involved in more overdose deaths during

2007 than both heroin and cocaine combined.⁹ Another source of information on overdoses, the Drug Abuse Warning Network, noted that in 2008 emergency departments reported that pharmaceuticals were involved in 93% of drug-related suicide attempts among young adults. Women, 18-24 yo, accounted for almost three of every five visits to the ED for drug-related suicide attempts.¹⁰

National studies and surveillance systems have provided important demographic and usage data on nonmedical use of prescription drugs for large segments of the population. However, characteristics and patterns for subpopulations may not be adequately addressed by the findings.¹¹ Risk factors for misusing prescribed drugs among populations of young women have been previously identified, such as Caucasian/white ancestry, less than high school education, low socioeconomic status, age at substance initiation, use of other illicit substances, tobacco use, pregnancy history, depressive symptoms, and challenges during key life transitions.¹²⁻¹⁵ However, a number of studies on this topic have been limited to college students.¹⁶⁻¹⁹ Far less information is available on healthy women of reproductive age, who are eligible for public healthcare and who have attained only a moderate level of education. This is an important gap in the literature as findings from national surveys suggest that they may be at higher risk of prescription drug misuse than their peers who are enrolled in college. For example, data from the survey "Monitoring the Future" observed that lifetime prevalence of sedative and tranquilizer use among young women who did not attend college group was higher (sedatives 14.2% to 5.7% and tranquilizers 18% to 7.6%) than those who did attend college.³ Newly released information from the 2009 NSDUH indicates that full-time female college students reported lower rates of past month nonmedical use of all classes of psychotherapeutics (5.7%) than other females aged 18-22 (6.3%). Pain relievers were the most misused among both groups, with higher use among other females (4.0% college women; 5.1% other females).²⁰ In addition, subpopulation characteristics such as income level may be an important contextual factor. For example, in 2002, 18.9 million women in the US attended a reproductive health clinic designed to serve those with low-incomes. Women tended to be under 25 years of age, never married, cohabitating, and in the lowest income group. Adolescents (15-19 yo) and young women (20-24) constituted the largest groups among these patients (19.1% and 24.1% respectively).^{21, 22} Directly related to these reports, as well as our participants and performance sites, another study found that women with past-year nonmedical use of prescription opioids were almost twice as likely to be receiving government sponsored medical assistance.¹⁴ Thus, public reproductive health clinics are key to future efforts to prevent misuse of prescription drugs among this subpopulation.

A better understanding of risk behaviors and contextual factors in this age range is critical because these years comprise an important transition period for young women between adolescence and adulthood: the end of high school years, transition to greater independence either through college, employment, marriage, cohabitation, and potentially the experience of life events, such as initial use of birth control, pregnancy termination, or birth of a child.¹² In addition, while extensive information on prescription drug misuse has been provided by national surveys, few studies in healthcare settings have examined healthy young women with limited resources. More information is needed for the development of appropriate prevention intervention efforts in this subpopulation. The purpose of this study was to examine the prevalence and correlates of prescription drug misuse among a large number of low-income women 16-24 years of age from three different races/ethnicities who received care at a public reproductive health clinic.

Methods

Study Design

Between August 2008 and August 2010, we conducted a cross sectional survey on health behaviors among women 16-24 years of age seen one of five reproductive health clinics in southeast Texas, administered by the University of Texas Medical Branch (UTMB). None of these clinics is located in the Texas-Mexico border region. These stand-alone clinics are situated in areas that are highly accessible from nearby neighborhoods, where residents represent a mix of race/ethnicities. Although women with personal means or private insurance are welcome at these clinics, almost all patients receive some type of government assistance for their healthcare. Prior to their appointments, all patients were interviewed by financial screening staff to determine eligibility for federal or state assistance. Financial screeners and clinic staff were not members of the research team. The research study staff reviewed the daily census at each clinic to determine which patients would meet our target age range. The research study staff maintained a log of participants who completed the survey, which was checked daily to prevent our approaching someone more than once. A research assistant approached patients deemed eligible in the privacy of the examination room, inviting them to complete a health survey. After obtaining written consent, the research assistant provided the pencil-paper survey instrument to the patient. The research assistant left the room during survey completion, returning to retrieve the instrument from the patient at the conclusion of the examination. The study protocol was approved by the Institutional Review Board at UTMB.

Participants

Eligible women were approached in the examination room by a trained, experienced, research assistant. Exclusions included: being of an age not in our target range (16-24 years); inability to provide informed consent; or having completed the survey at an earlier time. Those who agreed to participate were reimbursed \$5 for their time.

Measures

This study focused on data obtained on misuse of four classes of prescription drugs: pain relievers, tranquilizers, stimulants and sedatives. Questions in this topic were adapted from those used in the 2007 National Survey of Drug Use and Health (NSDUH).²³ The prevalence and timing of drug misuse were first assessed with three questions on each class. For example, for pain relievers, we asked: 1) "Have you ever, even once, used a prescription pain reliever that was not prescribed for you or that you took only for the experience or feeling it caused? (responses: yes or no). 2) How long has it been since you last used any prescription pain reliever that was not prescribed for you or that you took only for the experience or feeling it caused? (responses: have never used, within the past 30 days, more than 30 days ago but within the last year, and more than a year ago). 3) During the past 30 days, on how many days did you use a prescription pain reliever that was not prescribed for you or that you took only for the experience or feeling it caused?" Nine more questions for the other three drug classes were asked with identical response scales and wording. The first two questions for each class were then combined to generate four variables, one for each of the four drug classes (ever used vs. never used). Finally, these four variables were combined to measure the global misuse of prescription drugs, i.e. whether a respondent used any of the four classes during their lifetime. An additional survey question addressed the source of medications.

Information was also obtained on the patient's age, race/ethnicity, education, income, marital status, number of hours worked per week, attendance at religious gatherings, smoking status, risky sexual behavior and illegal substance use. Among Hispanics,

acculturation level was assessed using four items from the Short Acculturation Scale for Hispanics (SASH).²⁴

All participants also completed standardized measures to assess depressive symptoms, perceived stress, health beliefs, and exposure to traumatic events. Depressive symptoms were assessed with the 7-item Beck Depression Inventory (BDI)-Fast Screen for use in adolescents and adults in a clinical setting.²⁵ The Deployment Risk and Resiliency Inventory (DRRI) was used to assess risk and resilience factors among women with prior exposure to traumatic events.²⁶ To measure the degree to which situations in their life during the past month were viewed as stressful, we administered the 10-item Perceived Stress Scale (PSS).^{27,28} In addition, Health Locus of Control (HLC), which is the degree to which individuals believe that their health is controlled by internal or external factors, was measured using the HLC scale.²⁹ HLC scale consists of three 6-item subscales measuring five domains of control over one's health; internal control, chance, powerful others, doctors, and others. Finally, we used the post traumatic stress disorder (PTSD) subscale of the Psychiatric Diagnostic Screening Questionnaire (PDSQ) to assess symptoms related to this disorder.^{30,31}

Data Analysis

Bivariate comparisons were performed to compare the two groups (ever misused prescription drugs vs. never misused prescription drugs) using chi square test or Student's *t* test, as appropriate. Multivariate logistic regression was used to identify correlates of prescription drug abuse overall and for each type of drug. Variables were screened for inclusion in an initial multivariable model. Candidate variables with $P \leq .20$ were included in the initial multivariable model while variables with $P > 0.10$ were excluded from the final model. The Hosmer-Lemeshow test³² and area under the receiver operating characteristics (ROC) curve were used to assess the fit and predictive ability of the final model. All analyses were performed using STATA 11 (Stata Corporation, College Station, TX).

Results

Almost 83% (3181/3835) percent of invited women agreed to participate, yielding 3,181 surveys. However, 205 women who completed only part of the survey did not respond to the questions on prescription drug use. Thus, this report includes data from the 2,976 women who completed the entire survey. The nonrespondents to these questions did not differ by age or income ($P > .05$ for both) from those included in the analysis. However, they were more likely to be married or living with a partner, Hispanic, and lack completion of high school ($P < .01$ for all) than the 2,976 women who responded to all questions.

Of the 2,976 women included in this study, 44.6% ($n = 1,326$) were Hispanic (primarily Mexican or Mexican-American), 28.9% ($n = 860$) were white, 25.8% ($n = 767$) were African-American, and 0.8% ($n = 23$) were from another racial/ethnic group. The mean age of the sample was 20.8 years ($SD = 2.5$). Educational attainment was moderate, considering the mean age: 18.3% had not completed high school; 18.9% were currently enrolled in high school; 32.8% were high school graduates; and 25.7% had some college hours. Household incomes were low with 84.9% below \$50,000/yr and 75.9% below \$30,000/yr.

Rates of Medication Misuse

Overall, 30.1% (895/2976) of the sample reported ever misusing at least one prescription drug while 15.0% (447/2976) and 6.8% (201/2976) of them reported use within the last year and the last month, respectively (Figure 1). Eighteen percent of the respondents misused only one prescription drug while 12% misused multiple drugs. The most common type

misused was pain relievers. For all four classes of drugs, over 60% had limited their misuse to less than 3 days in the last month (Figure 2).

Bivariate Analyses

Bivariate analysis showed that the rate of prescription drug misuse differed by race/ethnicity with 39.4% of white women reporting prior misuse as compared with 25.8% of blacks and 26.6% of Hispanics ($P<.001$). Among Hispanics, mean acculturation scores were higher among those who had misused prescription drugs than those who had not (data not shown). Moreover, those who reported misusing prescription drugs were less likely to attend religious gatherings and more likely to work more hours outside the home each week (Table 1). Chronological age, marital status, educational status, and household income did not differ between the two groups.

With regard to risky sexual behavior, those with a history of misusing prescription drugs were more likely to initiate sexual intercourse at <15 years of age than those who did not misuse prescription drugs. Misusers also reported more sexual partners during the last 3 months (Table 2). Separate analysis among never married, divorced or separated women showed that women who misused drugs were less likely to use any contraception or condoms at last sexual intercourse compared with nonmisusers.

Evaluation of the co-occurrence of prescription drug use with illegal substance use demonstrated that those who had misused prescription drugs were more likely to smoke regularly and to have used illicit drugs. In fact, over two-thirds (70.3%) of those who misused prescription drugs had used at least one illegal drug during their life time and approximately one third had used two or more illegal drugs (Table 3). The most common illegal drug reported by those who misused prescription drugs was marijuana followed by cocaine powder.

Prescription drug misuse among this population was also associated with higher scores on a number of the psychological measures. These women scored higher on the BDI as well as the trauma, stress, and PTSD scales. However, locus of control scores did not differ between the two groups (Table 4).

Multivariate Analyses

Variables that met the screening criteria ($P<0.2$ in bivariate analysis) for inclusion in the multivariable model (any prescription drug misuse) were age, race/ethnicity, marital status, number of hours worked per week, attending religious gatherings, smoking status, history of substance abuse, age at first sexual intercourse, number of sexual partners during the last 3 months, as well as trauma, stress, and PTSD scores. Variables with $P>.20$ (age and work hours per week) were excluded from the final model. The logistic models for any prescription drug misuse, and individual prescription drug misuse yielded P -values for the Hosmer-Lemeshow test of 0.297-0.774 and the estimated area under the ROC curve ranged between 0.71 and 0.77.

The model with any prescription drug misuse as a dependent variable demonstrated that women who initiated sexual intercourse at <15 years of age (odds ratio (OR) 1.37, 95% confidence intervals (CI): 1.12-1.69) were more likely to have misused prescription drugs (Table 5). Higher trauma (OR 1.04, 95% CI 1.01-1.07), stress (OR 1.02, 95% CI 1.01-1.04), and posttraumatic stress disorder scores OR 1.04, 95% CI 1.01-1.09) were associated with an increased risk of prescription drug use. In addition, those who smoked everyday (OR 1.63, 95% CI 1.25-2.13) or had a history of substance use (OR 2.47, 95% CI 2.00-3.06) were more likely to report misusing prescription drugs. A similar model with use of pain relievers as a dependent variable identified irregular smoking as an additional risk factor.

Black women were less likely than whites to misuse tranquilizers, stimulants, and sedatives while Hispanics were less likely than whites to misuse stimulants. A separate model based on drug misuse during the last year only showed several of the same correlates as those in the model based on ever use. These included initiating sexual intercourse at <15 years of age (OR 1.32, 95% CI 1.03-1.69), smoking everyday (OR 1.68, 95% CI 1.22-2.30), stress (OR 1.03, 95% CI 1.01-1.05), and substance use (OR 1.71, 95% CI 1.30-2.24). Trauma and PTSD scores were not statistically significant in the model for use in the last year.

To examine the effect of acculturation on prescription drug misuse (using separate models for any drug and each of the drugs) in the multivariate model, separate logistic regression analyses were performed using only data on Hispanic women. This variable was not significant in any logistic regression model. BDI scores were available on only 2393 women, so separate multivariate logistic models were performed for this outcome; no significant effect was observed. Separate logistic models examined the association between pregnancy termination and prescription drug misuse based on ever pregnant women. Women who had two or more pregnancy terminations were more likely to misuse any prescription drug (OR 1.56, 95% CI, 1.01-2.40), pain relievers (OR 1.82, 95% CI, 1.16-2.86) and sedatives (OR 3.04, 95% CI, 1.39-6.66) compared to those who had not terminated a previous pregnancy.

Of the 895 women who reported misusing prescription drugs, 486 women provided information on their source. Almost 49% (n=236) reported that they obtained the prescription drug from a friend while 92 (18.9%) women obtained it from a family member. Thirty-six women (7.4%) replied that they purchased the drug from someone who was not a family member or friend while 15 women (3.1%) stated that they obtained it from a pain clinic. Seventy-nine women had a history of obtaining the drug from multiple sources: 38 (7.8%) obtained them free from a friend or purchased them from someone else, 19 (3.9%) obtained them from a family member and a friend, and 22 (4.5%) obtained them from a family member/friend and purchased them from someone else.

Discussion

In this study, we observed an overall lifetime prevalence of 30% of prescription drug misuse. However, use in the past year was much lower at 15%. This rate is somewhat higher than to that reported for 18-15 yo females in the 2009 NSDUH data, which found a prevalence of 13.4%.³³ Thus, our report confirms a high rate of prescription drug misuse among young women with limited resources. One possible reason for this finding may be increased access to these medications due to increased availability. For example, The US Drug Enforcement Agency's *Automation of Reports and Consolidated Order System* (ARCOS), which monitors opioid delivery to US pharmacies and other providers, notes that pharmacies purchased significantly greater amounts of oxycodone (903% more) and hydrocodone (354% more) in 2006 as compared with 1997.³⁴ Similar surveillance data indicate that expenditures for prescription analgesics purchased in an outpatient setting more than tripled from 1996 to 2006, rising from \$4.2 billion to \$13.2 billion.³⁵ This is a significant concern as drug availability has been described as a powerful predictor of substance abuse in young people.¹³ Another contributing factor to availability may be the high rate of unused medication retained by women (67.6%), who often store them where they can be accessed easily by other family members.³⁶

Consistent with prior reports, we found that the most common source of these drugs was a friend followed by a family member.³⁷ This practice of prescription drug "sharing" is common in the US. In one study, about 40% of participants reported willingness to share medications if they came from a family member.³⁸ Furthermore, women have been reported

to be more likely to share medications than men, with reproductive-aged women more likely than those of other age groups to borrow or lend pain relievers.³⁹ This finding warrants special concern because evidence indicates that narcotic analgesics are prescribed more frequently for women^{35,40-42} and those who misuse opioids may progress more quickly to addiction.¹⁵ Also, a recent 3-year study demonstrated that nonmedical use at younger ages (18-24 years) in Wave I (2001-2002) was associated with greater odds of opioid abuse or dependence at Wave II (2004-2005).⁴³ Although we did not investigate if women perceived that using someone else's medication is safe, it is possible that using medications originally prescribed by a physician led to a false sense of safety.^{44,45} Future studies are needed to determine if women recognize the risks involved in taking prescription medications intended for someone else.

We observed that prescription drug use was associated with initiation of sexual intercourse at a younger age. This finding is similar to those observed among young users of illicit drugs. For example, a 6-year comparison of a clinical population of adolescents in substance treatment to a similar group of nonabusing community youth found that the treatment group reported onset of sexual activity at younger age and had more sexual partners than the community group.⁴⁶ Furthermore, treatment girls exhibited almost twice the pregnancy rate of community girls over the 6 years (54% vs. 28%). This combination of early initiation of sexual intercourse and illicit substance use is associated with increasing substance use during later adolescence.⁴⁷ Thus, these young women need to be targeted for early intervention.

We also observed a strong relationship between prescription drug use and illicit substance use during adolescence as 70% of prescription drug misusers had used at least one illicit drug during their lifetime. In fact, lifetime use of illicit drugs in this clinical population greatly exceeded that reported for females in the 2009 NSDUH (25.6% among females, 12-17 yo; 54% among females, 18-25 yo).⁴⁸ The most common illicit drug reported by those who misused prescription drugs was marijuana followed by cocaine. Moreover, young women who smoked everyday were more likely to misuse prescription drugs. This is in agreement with NSDUH data which found that adolescents who smoked during the last month were nine times more likely to report illicit drug use than nonsmoking peers (49.0% vs. 5.3% respectively).⁴⁹

Moreover, those with a history of misusing prescription drugs had higher trauma, stress, and PTSD scores. Prior studies have shown that young women tend to respond to trauma and stress with substance use, particularly smoking.¹² This may have influenced our findings, as we began data collection shortly before the region was heavily impacted by Hurricane Ike and continued for two years thereafter. However, due to the cross sectional design of this study, we could not determine if the relationship was causal. Further studies are needed on this topic as little is known about the relationship of trauma and stress to nonmedical use of prescription drugs, particularly in emerging adults.⁵⁰ With regard to educational level, we found no differences between nonmisusers and misusers. A possible explanation may be that contrary to national data, we had a lower percentage of participants with less than a high school education (31.6% national vs 18.3% our study), as well as higher percentage who reported high school graduation (29.2% national vs 32.8% our study).³³ In addition, perhaps having respondents, the majority of whom qualified for subsidized healthcare based on low household income, contributed to this finding.

Although prior studies have established that young women are more vulnerable to substance abuse than their male peers,¹² our study adds to the literature by examining the nonmedical use of prescription drugs in relation to sexual and reproductive risk behaviors of young women seen in public clinics. As mentioned above, our cross-sectional survey data prevents

our ability to establish causal relationships or pathways to misuse of these drugs. In addition, the self-reported information on sensitive issues such as sexual behavior and drug use may be subject to under-reporting and recall bias. Furthermore, this study was limited to low income women seeking reproductive health care and may not be generalizable to other populations. However, this study is among the first to examine the misuse of prescription drugs among non-institutionalized healthy women who get the bulk of their healthcare needs met in public reproductive health clinics. Since eligibility requirements for assistance with reproductive health costs are similar across the country, our findings may generalize to this growing subpopulation of young women. The high prevalence and ready sources found in our study demonstrate an urgent need for longitudinal studies in young women with limited resources, directed at increasing their knowledge of the risks involved and promoting a greater awareness among clinicians who provide their health care.

Acknowledgments

Sources of support: Dr. Berenson is supported by a Midcareer Investigator Award In Patient-Oriented Research (K24HD043659) from the Eunice Kennedy Shriver National Institute of Child Health and Human Development. Content of this manuscript is solely the responsibility of the authors and does not necessarily represent the official views of NIH/NICHD.

References

1. Colliver, JD.; Kroutil, LA.; Dai, L.; Gfroerer, JC. Misuse of prescription drugs: Data from the 2002, 2003, 2004 National surveys on Drug Use and Health. Substance Abuse and Mental Health Services Administration (SAMHSA), Office of Applied Studies; Rockville MD: 2006. DHHS Publication No. SMA 06-4192
2. Blanco C, Alderson D, Ogburn E, Grant BF, Nunes EV, Hatzenbuehler ML, Hasin DS. Changes in the prevalence of non-medical prescription drug use and drug use disorders in the United States: 1991-1992 and 2001-2002. *Drug Alcohol Depend.* 2007; 90:252–60. [PubMed: 17513069]
3. Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE. Monitoring the Future national survey results on drug use, 1975 – 2008: Volume II, college students and adults ages 19 -50. National Institute on Drug Abuse; Bethesda MD: 2009. NIH Publication No. 09-7403
4. McCabe SE, Cranford JA, West BT. Trends in prescription drug abuse and dependence, co-occurrence with other substance use disorders, and treatment utilization: results from two national surveys. *Addict Behav.* 2008; 33:1297–305. [PubMed: 18632211]
5. Substance Abuse and Mental Health Services Administration. Office of Applied Studies. Results from the 2009 National Survey on Drug Use and Health: National Findings. SAMHSA; Rockville, MD: 2010. NSDUH Series H-38AHHHS Publication No. SMA 10-4586 Findings
6. Coben JH, Davis SM, Furbee PM, Sikora RD, Tillotson RD, Bossarte RM. Hospitalizations for poisoning by prescription opioids, sedatives, and tranquilizers. *Am J Prev Med.* 2010; 38:517–24. [PubMed: 20409500]
7. Centers for Disease Control and Prevention. Unintentional poisoning deaths – United States 1999-2004. *MMWR Weekly.* 2007; 56:93–6.
8. Warner, M.; Chen, LH.; Makuc, DM. Increase in fatal poisonings involving opioid analgesics in the United States 1999-2006. CDC National Center for Health Statistics; Hyattsville MD: 2009. NCHS Data Brief. No. 22; 2009
9. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. National Vital Statistics System: Unintentional drug poisoning in the United States. CDC; Atlanta GA: July. 2010
10. Substance Abuse and Mental Health Services Administration, Office of Applied Studies. The DAWN Report: Emergency department visits for drug-related suicide attempts by young adults aged 18 to 24:2008. SAMSHA; Rockville MD: May 25. 2010
11. Riggs P. Non-medical use and abuse of commonly prescribed medications. *Curr Med Res Opin.* 2008; 24:869–77. [PubMed: 18267053]

12. National Center on Addiction and Substance Abuse. Formative years: pathways to substance abuse among girls and young women ages 8-22. Columbia University; New York: 2003.
13. Sung HE, Richter L, Vaughan R, Johnson PB, Thom B. Nonmedical use of prescription opioids among teenagers in the United States: trends and correlates. *J Adolesc Health*. 2005; 37:44–51. [PubMed: 15963906]
14. Tetrault JM, Desai RA, Becker WC, Fiellin DA, Concato J, Sullivan LE. Gender and non-medical use of prescription opioids: results from a national US survey. *Addiction*. 2007; 103:258–68. [PubMed: 18042194]
15. Kay A, Taylor TE, Barthwell AG, Wichelecki J, Leopold V. Substance use and women's health. *J Addict Dis*. 2010; 29:139–63. [PubMed: 20407973]
16. Kaloyanides KB, McCabe SE, Cranford JA, Teter CJ. Prevalence of illicit use and abuse of prescription stimulants, alcohol, and other drugs among college students: relationship with age at initiation of prescription stimulants. *Pharmacotherapy*. 2007; 27:666–74. [PubMed: 17461701]
17. DeSantis AD, Webb EM, Noar SM. Illicit use of prescription ADHD medications on a college campus: a multimethodological approach. *J Am Coll Health*. 2008; 57:315–24. [PubMed: 18980888]
18. Rabiner DL, Anastopoulos AD, Costello EJ, McCabe SE, Swartzwelder HS. The misuse and diversion of prescribed ADHD medications by college students. *J Att Dis*. 2009; 13:144–53.
19. McCabe SE, Teter CJ, Boyd CJ. Illicit use of prescription among college students. *Drug Alcohol Depend*. 2005; 77:37–47. [PubMed: 15607840]
20. Substance Abuse and Mental Health Services Administration. Office of Applied Studies. [Accessed 10/16/2010] Results from the 2009 National Survey on Drug Use and Health: Detailed Tables. Miscellaneous Tables. Table 6.81B. Available at <http://www.oas.samhsa.gov/NSDUH/2k9NSDUH/tabs/TOC.htm>
21. Mosher WD, Martinez GM, Chandra A, Abma JC, Willson SJ. Use of contraception and use of family planning services in the United States: 1982-2002 (National Survey of Family Growth). *Adv Data*. 2004; 350:1–36. [PubMed: 15633582]
22. Chandra A, Martinez GM, Mosher WD, Abma JC, Jones J. Fertility, family planning, and reproductive health of U.S. women: data from the 2002 National Survey of Family Growth. *Vital Health Stat*. 2005; 23:1–160.
23. Substance Abuse and Mental Health Services Administration, Office of Applied Studies. [Accessed October 2008] 2007 National Survey of Drug Use and Health (NSDUH). 2007. Available at <http://www.oas.samhsa.gov/nsduh/2k7MRB/2k7Q.pdf>
24. Marin G, Sabogal F, Marin B VanOss, Otero-Sabogal F, Perez-Stable EJ. Development of a short acculturation scale for Hispanics. *Hisp J Behav Sci*. 1987; 9:183–205.
25. Beck, AT.; Steer, RA.; Brown, GK. BDI-II fast screen for medical patients manual. Pearson; San Antonio TX: 2009.
26. King LA, King DW, Vogt DS, Knight J. Deployment risk and resiliency inventory: a collection of measures for studying deployment-related experiences on military personnel and veterans. *Mil Psychol*. 2006; 18:89–120.
27. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav*. 1983; 24:385–96. [PubMed: 6668417]
28. Cole SR. Assessment of differential item functioning in the Perceived Stress Scale-10. *J Epidemiol Community Health*. 1999; 53:319–20. [PubMed: 10396541]
29. Wallston KA. The validity of the multidimensional health locus of control scales. *J Health Psychol*. 2005; 10:623–31. [PubMed: 16033784]
30. Zimmerman M, Mattia JI. The psychiatric diagnostic screening questionnaire: development, reliability, and validity. *Compr Psychiatry*. 2001; 42:175–89. [PubMed: 11349235]
31. Zimmerman M, Mattia JI. A self-report scale to help make psychiatric diagnoses. *Arch Gen Psychiatry*. 2001; 58:787–94. [PubMed: 11483146]
32. Hosmer, DW., Jr; Lemeshow, S. Applied Logistic Regression. 2nd Edition. John Wiley & Sons, Inc.; New York NY: 2000.
33. Substance Abuse and Mental Health Services Administration. Office of Applied Studies. [Accessed 10/16/2010] Results from the 2009 National Survey on Drug Use and Health: Detailed

- Tables. Illicit Drug Use Tables. Table 1.51B. Sept. 2010 Available at <http://www.oas.samhsa.gov/NSDUH/2k9NSDUH/tabs/TOC.htm>
34. US Department of Justice. Drug Enforcement Agency. Office of Diversion Control. [Accessed 05/24/2010] Automatation of Reports and Consolidated Order System. Retail Drug Summary Reports: ARCOS 2-Report 7 for 1997 and 2006. Available at http://www.deadiversion.usdoj.gov/arcos/retail_drug_summary/index.html
 35. Stagnitti, MN. Medical Expenditure Panel Survey Statistical Brief #235. Agency for Healthcare Research and Quality; Rockville MD: 2009. Trends in outpatient prescription analgesics utilization and expenditure for the US noninstitutionalized population, 1996 and 2006.
 36. Back SE, Payne RA, Waldrop AE, Smith A, Reeves S, Brady KT. Prescription opioid aberrant behaviors: a pilot study of sex differences. *Clin J Pain*. 2009; 25:477–84. [PubMed: 19542794]
 37. Substance Abuse and Mental Health Services Administration. Office of Applied Studies. [Accessed 10/16/2010] Results from the 2009 National Survey on Drug Use and Health: Detailed Tables. Miscellaneous Tables. Table 6.47B. Sept. 2010 Available at <http://www.oas.samhsa.gov/NSDUH/2k9NSDUH/tabs/TOC.htm>
 38. Goldsworthy RC, Schwartz NC, Mayhorn CB. Beyond abuse and exposure: framing the impact of prescription-medication sharing. *Am J Public Health*. 2008; 98:1115–21. [PubMed: 18445792]
 39. Petersen EE, Rasmussen SA, Daniel KL, Yazdy MM, Honein MA. Prescription medication borrowing and sharing among women of reproductive age. *J Womens Health (Larchmt)*. 2008; 17:1073–80. [PubMed: 18774892]
 40. Simoni-Wastila L. The use of abusable prescription drugs: the role of gender. *J Womens Health Gend Based Med*. 2000; 9:289–97. [PubMed: 10787224]
 41. National Institutes of Health; National Institute on Drug Abuse. Research Report Series: Prescription drugs abuse and addiction. NIH Publication Number 05-4881, Rev. 08/2005.
 42. Kelly JP, Cook SF, Kaufman DW, Anderson T, Rosenberg L, Mitchell AA. Prevalence and characteristics of opioid use in the US adult population. *Pain*. 2008; 138:507–13. [PubMed: 18342447]
 43. Boyd CJ, Teter CJ, West BT, Morales M, McCabe SE. Non-medical use of prescription analgesics: a three-year national longitudinal study. *J Addict Dis*. 2009; 28:232–42. [PubMed: 20155592]
 44. Office of National Drug Control Policy. [Accessed 06/15/2010] Fact Sheet: Prescription Drugs: Weighing the Benefits and the Risks. May. 2010 Available at www.WhiteHouseDrugPolicy.gov
 45. National Institutes of Health. National Institute on Drug Abuse. NIDA Topics in Brief: Prescription Drug Abuse – A Research Update. Sept. 2010
 46. Tapert SF, Aarons GA, Sedlar GR, Brown SA. Adolescent substance use and sexual risk-taking behavior. *J Adolesc Health*. 2001; 28:181–9. [PubMed: 11226840]
 47. Wu J, Witkiewitz K, McMahon RJ, Dodge KA. Conduct Problems Prevention Research Group. A parallel process growth mixture model of conduct problems and substance use with risky sexual behavior. *Drug Alcohol Depend*. 2010; 111:207–14. [PubMed: 20558013]
 48. Substance Abuse and Mental Health Services Administration. Office of Applied Studies. [Accessed 10/25/2010] Results from the 2009 National Survey on Drug Use and Health: Detailed Tables. Illicit Drug Use Tables. Tables 1.20B, 1.21B. Sept. 2010 Available at <http://www.oas.samhsa.gov/NSDUH/2k9NSDUH/tabs/TOC.htm>
 49. Substance Abuse and Mental Health Services Administration. Office of Applied Studies. Results from the 2008 national Survey on Drug Use and Health: National Findings. SAMHSA; Rockville MD: 2009. p. 29NSDUH Series H-336HHS Publication No. SMA 09-4434
 50. McCauley JL, Danielson CK, Amstadter AB, Ruggiero KJ, Resnick HS, Hanson RF, Smith DW, Saunders BE, Kilpatrick DG. The role of traumatic event history in non-medical use of prescription drugs among a nationally representative sample of US adolescents. *J Child Psychol Psychiatry*. 2010; 51:84–93. [PubMed: 19674194]

Figure 1.
Prevalence of prescription drug misuse based on type and timing of use

Figure 2.
Frequency of prescription drug misuse in last 30 days among ever users

Table 1

Characteristics of participants by prescription drug misuse

Characteristics	Ever misused prescription drug (n=895)	Did not misuse prescription drug (n=2081)	<i>P</i> value
Age, yr, mean ($\pm$ SD)	20.7 (2.5)	20.9 (2.5)	.140
Race/ethnicity, (%)			<.001
Whites	339 (37.9)	521 (25.0)	
Black	198 (22.1)	569 (27.3)	
Hispanic	352 (39.3)	974 (46.8)	
Others *	6 (0.7)	17 (0.8)	
Country of birth			<.001
USA	754 (84.3)	1535 (73.8)	
Other	141 (15.8)	544 (26.2)	
Mean acculturation score ($\pm$ SD) [§]	3.4 (1.4)	2.9 (1.5)	<.001
Marital status			.529
Never married	537 (60.0)	1228 (59.0)	
Living together/currently married	311 (34.8)	737 (35.4)	
Divorced/Separated	47 (5.3)	116 (5.6)	
Education			.312
Did not complete HS	157 (17.6)	387 (18.9)	
Currently enrolled or HS graduate	486 (54.6)	1052 (51.5)	
At least some college education	248 (27.8)	604 (29.6)	
Household income			.516
<30,000	692 (77.3)	1566 (75.3)	
30,000 or more	117 (13.1)	286 (13.7)	
Unknown	86 (9.6)	229 (11.0)	
Work (hours/week)			.026
Do not work	471 (52.7)	1121 (54.2)	
1-20 hours/week	76 (8.5)	230 (11.1)	
21 or more	347 (38.8)	718 (34.7)	
Attending religious gatherings			<.001
Do not attend	252 (28.3)	443 (21.5)	
Few times a year to once per month	421 (47.3)	1000 (48.5)	
At least once a week	218 (24.5)	620 (30.1)	
Adults in the household, mean ($\pm$ SD)	2.3 (1.0)	2.2 (1.0)	.158
Children in the household, mean ($\pm$ SD)	1.4 (1.2)	1.5 (1.2)	.230
Smoked cigarette during last 30 days			<.001
Did not smoke at all	498 (55.7)	1623 (78.2)	
Not everyday	183 (20.5)	244 (11.8)	
Everyday	213 (23.8)	208 (10.0)	

SD: Standard deviation

* Asians/American Indians/Alaskan/Native Hawaiian

[§]Based on only Hispanic women

Table 2

Prescription drug misuse by sexual behavior and pregnancy termination

Characteristics	Ever misused prescription drug	Did not misuse prescription drug	P value
Age at first sexual intercourse			<.001
<15	289 (32.7)	427 (21.3)	
15-17	496 (56.1)	1177 (58.6)	
≥18	99 (11.2)	405 (20.2)	
Number of sexual partner during last 3 months			.006
0	60 (6.8)	179 (8.6)	
1	626 (70.4)	1517 (73.2)	
≥2	203 (22.8)	377 (18.2)	
Use of contraceptive at last sexual intercourse [†]			.051
Did not use	179 (31.1)	340 (26.7)	
Used	397 (68.9)	935 (73.3)	
Use of condoms in last 3 months [†]			.016
Not every time	430 (75.3)	880 (69.8)	
Every time	141 (24.7)	380 (30.2)	
Pregnancy termination history [‡]			.797
0	413 (73.5)	972 (74.1)	
1	97 (17.3)	231 (17.6)	
2 or more	52 (9.3)	109 (8.3)	

[†]Based on never married/divorced/separated women[‡]Based on women with history of pregnancy

Table 3

Co-occurrence of prescription drug misuse and substance abuse

Substance abuse	Ever misused prescription drug	Did not misuse prescription drug	<i>P</i> value
Any substance use drug			<.001
Never used	263 (29.7)	1280 (61.9)	
Ever used	622 (70.3)	789 (38.1)	
Number of substance use drug			<.001
0	263 (29.7)	1280 (61.9)	
1	339 (38.3)	641 (31.0)	
2	193 (21.8)	97 (4.7)	
3	57 (6.4)	12 (0.6)	
4	33 (3.7)	39 (1.9)	
Marijuana			<.001
Never used	266 (29.9)	1290 (62.2)	
Ever used	624 (70.1)	784 (37.8)	
Cracked cocaine			<.001
Never used	801 (90.4)	2015 (97.4)	
Ever used	85 (9.6)	54 (2.6)	
Cocaine powder			<.001
Never used	604 (68.0)	1919 (92.6)	
Ever used	284 (32.0)	153 (7.4)	
Heroin			<.001
Never used	842 (95.1)	2028 (97.9)	
Ever used	43 (4.9)	43 (2.1)	

Table 4

Prescription drug misuse by depression, trauma, stress, post traumatic stress disorder, and locus of control

Characteristics	Ever misused prescription drug	Did not misuse prescription drug	P value
Depression [†]			<.001
Minimal (0-3)	486 (66.7)	1333 (80.1)	
Mild (4-6)	124 (17.0)	185 (11.1)	
Moderate (7-9)	75 (10.3)	90 (5.4)	
Severe (10-21)	44 (6.0)	56 (3.4)	
Mean trauma score(DRRI scale) [‡]	4.8 (3.5)	3.4 (3.0)	<.001
Mean stress score (PSS score) ^{//}	28.8 (6.5)	26.9 (6.1)	<.001
Mean PDSQ-PTSD score [§]	2.2 (2.8)	1.2 (2.3)	<.001
Mean internal locus of control score ^{‡‡}	20.5 (3.8)	20.3 (3.9)	.295

[†] Based on Beck Depression Scale – Fast Screen (BDI-FS); range of score 0-21; higher score higher depression

[‡] DRRI scale = Deployment Risk and Resiliency Inventory scale ; Range of score: 0-16; higher score higher trauma

^{//} PSS= Perceived Stress Scale; Range of score:10-50; higher score higher stress

[§] Based on post traumatic stress disorder (PTSD) subscale of the Psychiatric Diagnostic Screening Questionnaire (PDSQ) scale; Range of score: 0-9; higher score higher PTSD

^{‡‡} Range of score: 6-30; higher score higher locus of control

Table 5

Correlates of prescription drug abuse in young reproductive-age women

Odds ratio (95% CI)					
Characteristics	Any prescription drug	Pain relievers	Tranquilizers	Stimulants	Sedatives
Race/ethnicity					
White	Reference	Reference	Reference	Reference	Reference
Black	0.82 (0.64-1.07)	0.79 (0.61-1.04)	0.43 (0.28-0.66)	0.60 (0.39-0.92)	0.51 (0.28-0.94)
Hispanic	0.95 (0.75-1.20)	0.79 (0.62-1.01)	1.02 (0.74-1.41)	0.67 (0.46-0.98)	1.03 (0.65-1.61)
Attending religious gatherings					
Do not attend	Reference	Reference	Reference	Reference	Reference
Few times a year to once per month	0.78 (0.60-1.01)	0.78 (0.59-1.03)	0.90 (0.60-1.36)	0.78 (0.51-1.20)	0.84 (0.50-1.42)
At least once a week	0.82 (0.65-1.02)	0.82 (0.65-1.04)	1.16 (0.84-1.60)	0.72 (0.51-1.02)	0.66 (0.42-1.02)
Smoked cigarette during last 30 days					
Did not smoke at all	Reference	Reference	Reference	Reference	Reference
Not everyday	1.23 (0.95-1.59)	1.40 (1.07-1.83)	1.25 (0.87-1.81)	1.34 (0.88-2.02)	0.92 (0.53-1.58)
Everyday	1.63 (1.25-2.13)	1.73 (1.32-2.27)	1.54 (1.06-2.20)	2.06 (1.41-3.00)	1.39 (0.85-2.28)
Age at first sexual intercourse					
≥ 15	Reference	Reference	Reference	Reference	Reference
<15 years	1.37 (1.12-1.69)	1.31 (1.05-1.62)	1.54 (1.15-2.06)	1.32 (0.96-1.81)	1.30 (0.87-1.95)
Trauma score [‡]	1.04 (1.01-1.07)	1.03 (0.99-1.07)	1.10 (1.05-1.15)	1.11 (1.06-1.17)	1.10 (1.03-1.18)
Stress score [¶]	1.02 (1.01-1.04)	1.02 (1.01-1.04)	1.03 (1.01-1.05)	1.00 (0.98-1.03)	1.03 (1.00-1.06)
PDSQ-PTSD score [§]	1.04 (1.01-1.09)	1.04 (1.00-1.09)	0.97 (0.92-1.03)	1.02 (0.96-1.09)	1.00 (0.92-1.08)
History of substance use	2.47 (2.00-3.06)	2.37 (1.89-2.98)	2.78 (1.95-3.97)	3.00 (1.97-4.57)	2.58 (1.55-4.29)

[‡]DRRI scale = Deployment Risk and Resiliency Inventory scale ; Range of score: 0-16; higher score higher trauma[¶]PSS= Perceived Stress Scale; Range of score:10-50; higher score higher stress[§]Based on post traumatic stress disorder (PTSD) subscale of the Psychiatric Diagnostic Screening Questionnaire (PDSQ) scale; Range of score: 0-9; higher score higher PTSD