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Gender and Prescription Opioids: Findings from the National Survey on Drug Use and Health

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Abstract

Background—Significant gender differences in drug and alcohol use have been reported, however little is known about gender differences in prescription opioid misuse and dependence. This study compared correlates, sources and predictors of prescription opioid non-medical use, as well as abuse or dependence among men and women in a nationally-representative sample.

Methods—Participants were 55,279 (26,746 men, 28,533 women) non-institutionalized civilians aged 12 years and older who participated in the National Survey on Drug Use and Health.

Results—Rates of lifetime and past year non-medical use of prescription opiates were 13.6% and 5.1%, respectively. Significantly more men than women endorsed lifetime (15.9% vs. 11.2%) and past year use (5.9% vs. 4.2%; $p < .0001$). Among past year users, 13.2% met criteria for current prescription opiate abuse or dependence, and this did not differ significantly by gender. Polysubstance use and treatment underutilization were common among both men and women, however significantly fewer women than men had received alcohol or drug abuse treatment ($p = .001$). Men were more likely than women to obtain prescription opioids for free from family or friends, and were more likely to purchase them from a dealer ($p < .01$). Gender-specific predictors of use as compared to abuse/dependence were also observed.

Conclusions—The findings highlight important differences between men and women using prescription opiates. The observed differences may help enhance the design of gender-sensitive surveillance, identification, prevention and treatment interventions.

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Keywords

Gender; prescription opioids; pain relievers; opiates; prescription drugs; non-medical use

1. Introduction

For millennia, opium has been used to relieve pain and other physical ailments. Since the early 19th century, when Sertürner isolated morphine from opium, opioids have been a mainstay in the implementation of surgical procedures and in the treatment of post-operative and chronic pain (Brownstein, 1993; Sertuerner, 1817). The most commonly prescribed medication of any category in the United States is hydrocodone/acetaminophen, surpassing over 100 million other medications, including cholesterol-lowering atorvastatin and the antibiotic amoxicillin (Kuehn, 2007). Unfortunately, as the number of prescriptions for the legitimate use of opioids has increased, so has their illegitimate use (Kuehn, 2007; McLellan and Turner, 2008).

The non-medical use, abuse and dependence on prescription opioids has experienced alarming growth over the past 10 years and poses a serious public health concern (Kuehn, 2007; Blanco et al., 2007; Compton and Volkow, 2006; Zacny et al., 2003; Wunsch et al., 2009). Prescription opioids have been shown to surpass all other illicit drugs as the most commonly initiated drug within the past year (SAMHSA, 2007). Furthermore, rates of prescription opioid-related Emergency Department (ED) visits have surged (Paulozzi, 2006; Hall et al., 2008; SAMHSA, 2008). Data from the Drug Abuse Warning Network (DAWN) estimates that from 2004 to 2006, ED visits related to opioid analgesics rose 43% and opioid analgesic-related suicide attempts rose 34% (SAMHSA, 2008). Overall, central nervous system (CNS) agents accounted for 50% of the 741,425 ED visits involving non-medical use of pharmaceuticals in 2006, and the most common CNS agents were opioid analgesics (33% of all non-medical use visits). Finally, one study investigating unintentional pharmaceutical overdose fatalities ($N=295$) found that opioid analgesics were taken by almost all (93.2%) of descendants, and that less than half actually had a prescription for opioid analgesics (Hall et al., 2008).

Putative reasons for the observed increase in prescription opioid misuse include, for example, the significant increase in the production and availability of prescription opioids and expanded use of prescription opioids in primary care settings (Goodman and Glassman, 2005; Reid et al., 2002). In comparison to other illicit drugs, prescription opioids may be less closely monitored by law enforcement and are less easily detectable by others (e.g., odorless) (Compton and Volkow, 2006). Furthermore, many individuals are susceptible to the mistaken belief that because opioids are prescribed by physicians and used to treat legitimate medical conditions, they are “safer” than other illicit drugs (Compton and Volkow, 2006; Ling et al., 2003). Given these unique characteristics, the prevention and treatment of non-medical prescription opioid use, abuse and dependence presents a formidable challenge to physicians and health care providers, and there is a critical need to better understand factors involved in susceptibility.

A robust literature surrounding gender and other substances of abuse (e.g., alcohol, cocaine, nicotine), demonstrates important differences between men and women with regard to a number of characteristics, such as, risk of susceptibility, age of substance use initiation, reasons for using substances, treatment entry rates and outcomes, and physiological consequences of substance use (Brady et al., 2009). To date, the role of gender with regard to prescription opioid misuse and dependence has received little attention. In a recent pilot study of gender differences in aberrant drug taking behaviors among 121 chronic pain patients (Back et al. 2009), our group found that women were significantly more likely than men to hoard unused medications and to use additional medications to enhance the effectiveness of pain medication. Higher rates of alternative routes of medication administration, such as crushing and snorting pain medication, was observed among men as compared to women. A retrospective cohort study (Banta-Green et al., 2009) examining prescription opioid use problems among 704 pain patients participating in an integrated medical practice found that males were more likely than females (OR = 1.95) to endorse addictive behaviors (e.g., requested an early refill, had a doctor refuse to prescribe the medication due to abuse concerns, used the medication for other symptoms such as sleep or anxiety). Using an even larger sample ($N=27,816$) of individuals seeking treatment for addiction, Carise and colleague (2007) found that men were significantly more likely than women to report abusing Oxycontin. Of particular relevance to the current study, Tetrault and colleagues (2007) utilized data from the 2003 National Survey on Drug Use and Health (NSDUH; $N=55,023$) to examine risk factors for prescription opiate non-medical use, stratified by gender. Illicit drug use, younger age, and emergency room visits were found to be associated with prescription opiate non-medical use among both men and women. Gender-specific correlates of prescription opiate use included serious mental illness and cigarette use among women, and inhalant use among men. Notably, the Tetrault et al. study focused on prescription opiate use only; correlates of prescription opiate abuse or dependence were not examined.

To further investigate the role of gender, the current study used a large nationally-representative sample to examine differences in correlates, sources and predictors of prescription opioid non-medical use, as well as abuse or dependence. While previous studies have examined gender differences in prescription opiate use *or* abuse/dependence, no study to our knowledge has examined and contrasted both conditions. As rates of prescription opioid use, abuse and dependence continue to rise in the United States, it is important to develop effective methods for identifying individuals most at risk. Furthermore, correlates of non-medical use and abuse/dependence can inform the design of secondary and tertiary interventions directed toward reducing harmful prescription opioid use.

2. Method

2.1 Participants and Data Source

Data were drawn from the Substance Abuse and Mental Health Services Administration's (SAMHSA) 2006 NSDUH ($N=55,279$), formerly the National Household Survey on Drug Abuse. The NSDUH is a self-report survey conducted annually in the United States that collects information on the prevalence and correlates of drug use among non-

institutionalized civilians aged 12 years and older, using a cross-sectional design. The survey sample employed a 50-state design with an independent, multistage area probability sample for each of the 50 states and the District of Columbia. Youths and young adults were oversampled so that each state's sample was approximately equally distributed among three major age groups: 12 to 17 years, 18 to 25 years, and 26 years or older. Each participant received \$30 for their time. More details regarding the sampling frame, interviewing and training can be found elsewhere (SAHMSA, 2007).

2.2 Measures

Prescription opioid non-medical use—In the NDSUH survey, prescription opioid non-medical use was assessed with the following question: “Have you ever, even once, used (name of prescription opioid) that was not prescribed for you or that you took only for the experience or feeling it caused?” Among users, the survey assessed age of onset by asking: “How old were you the first time you used any prescription pain reliever that was not prescribed for you or that you took only for the experience or feeling it caused?” Information regarding the frequency of use, type of opioids used, and source of prescription opioids was also collected.

Prescription opioid abuse and dependence—Past year prescription opioid abuse and dependence were assessed in the NSDUH survey using a slightly modified version of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition criteria (DSM-IV) (American Psychiatric Association, 2000). Specifically, in order to be classified as having prescription opioid *abuse*, respondents were required to endorse one or more of the following in the past year: (1) serious problems at home, work, or school caused by using prescription opioids; (2) use of prescription opioids in physically dangerous situations; (3) repeated trouble with the law as a result of the use of prescription opioids; or (4) problems with family or friends related to use of prescription opioids and continuing to use them anyways. In order to be classified as having prescription opioid *dependence*, respondents were required to endorse three or more of the following in the past year: (1) spent a great deal of time over a period of a month getting, using, or getting over the effects of prescription opioids; (2) used prescription opioids more often than intended or was unable to keep set limits on prescription opioid use; (3) needed to use prescription opioids more than before to get desired effects or noticed that the same amount of prescription opioids use had less effect than before; (4) inability to cut down or stop using prescription opioids every time tried or wanted to; (5) continued to use prescription opioids even though they were causing problems with mental or physical health; (6) prescription opioid use reduced or eliminated involvement or participation in important activities; (7) reported experiencing three or more prescription opioid withdrawal symptoms at the same time that lasted longer than a day after prescription opioids use was cut back or stopped. Withdrawal symptoms include (i) feeling blue or down, (ii) vomiting or feeling nauseous, (iii) cramps or muscle aches, (iv) teary eyes or a runny nose, (v) feeling sweaty, having enlarged pupils, or having body hair standing up on skin, (vi) diarrhea, (vii) yawning, (viii) fever, and (ix) difficulty sleeping.

Other substance use—The NSDUH survey assessed past year alcohol and other drug use with the following questions: “Have you ever, even once, had a drink of any type of

alcoholic beverage?” “Have you ever smoked part or all of a cigarette?” “Have you ever, even once, used marijuana or hashish?” “Have you ever, even once, used (cocaine, crack, heroin, hallucinogens)?” Inhalants were assessed with this question: “Have you ever, even once, inhaled amyl nitrite, ‘poppers,’ locker room odorizers, or ‘rush’ for kicks or to get high?” Tranquilizers, sedatives and stimulants were assessed with this question: “Have you ever, even once, used (tranquilizers, sedatives or stimulants) that were not prescribed for you or that you took only for the experience or feeling it caused?”

Alcohol and drug treatment utilization—Treatment utilization for alcohol and drug use or medical problems associated with alcohol and drug use was assessed in the NSDUH. Specifically, information was collected regarding the percent of participants that had received drug and alcohol treatment in their lifetime or in the past year, what substance the most recent treatment episode was targeting, and the treatment setting.

Serious psychological distress (SPD)—SPD was measured in the NDSUH survey using the Kessler Inventory (Kessler et al., 2003). Respondents 18 years and older were administered six questions inquiring about how frequently they experienced the following symptoms of distress during the past year: “feeling nervous,” “feeling hopeless,” “feeling restless or fidgety,” “feeling so sad or depressed that nothing could cheer you up,” “feeling everything was an effort,” and “feeling no good or worthless.” The variable, SPD, ranges from 0 to 24. This score was calculated by assigning a value of 0 to 4 to each reported response regarding the frequency of experienced symptoms of distress and summing values to calculate a total score.

2.3 Statistical Analysis

All analyses were performed using SAS version 9.2 (SAS Institute Inc., Cary, NC, USA). Variance estimates within this complex survey design analysis was correctly accounted for using SAS survey procedures (Oyeyemi et al., 2010). Initially, χ^2 tests were used to examine differences in subject characteristics, stratified by gender. Descriptive statistics were used to assess lifetime non-medical use of each of the opioids among past year users, stratified by gender. Differences between men and women were evaluated using Rao-Scott χ^2 tests. Bivariate associations between independent variables and past year use, or abuse/dependence of prescription opioids were reported as unadjusted odds ratios (OR) and 95% confidence intervals (CI). Statistical significance was assessed at $\alpha = 0.05$.

To examine predictors of non-medical use and abuse/dependence, manual backwards logistic regression analyses were conducted. Variables that were non-significant were removed from the model one at a time (p -value of the parameter estimate for each variable $< .05$) and we validated that the removal of each variable did not confound the parameter estimate for gender (i.e., did not cause a change in the beta for gender of greater than 10%). To examine the possibility of multicollinearity among the independent variables, correlations were performed and assessed between each covariate. Additionally, tolerance was assessed by variance inflation factor at a level of 2.0. No significant multicollinearity was found. Parsimonious models were then examined for gender interactions to confirm statistically

significant differences in predictors by gender. Lastly, in order to also examine predictors within each gender, gender-stratified models were examined.

3. Results

3.1 Demographic Characteristics of the Sample

Table 1 presents the demographic characteristics by gender ($N = 55,279$; 26,746 men, 28,533 women). The majority of participants were over 35 years of age, Caucasian, employed, and married.

3.2 Rates of Prescription Opioid Non-Medical Use

Overall rates of lifetime and current (i.e., past year) prescription opioid non-medical use were 13.6% and 5.1%, respectively. As can be seen in Table 1, significantly more men than women endorsed lifetime (15.9% vs. 11.2%; $p < .0001$) and past year (5.9% vs. 4.2%; $p < .0001$) non-medical use.

3.3 Rates of Prescription Opioid Abuse or Dependence

Among the full sample ($N = 55,279$), 0.66% met criteria for current abuse/dependence on prescription opioids. Among past year users ($n = 4,281$), 13.2% met criteria for current abuse or dependence on prescription opioids. No significant gender differences in rates of abuse/dependence among the entire sample or among past year users was revealed.

3.4 Treatment Utilization

Among past year users, significantly more men than women reported receiving treatment for alcohol or drug use problems at any point in their lifetime (10.9% vs. 5.7%, $p = .001$) and in the past year (5.0% vs. 2.7%, $p = .02$). Notably, only 2.2% of prescription opioid users reported that their last treatment episode was for prescription opioids and this did not differ significantly by gender.

3.5 Other Substance Use and Serious Psychological Distress

With regard to other substance use, the majority of current prescription opioid users endorsed past year use of alcohol (86.4%) and nicotine (60.7%) and this did not differ by gender. Endorsement of serious psychological distress did, however, differ by gender. Approximately one-quarter (25.7%) of prescription opioid users reported serious psychological distress, and rates were significantly higher among women than men (14.5% vs. 11.2%, $p < .0001$).

3.6 Sources of Prescription Opioids

Table 2 presents the sources from which non-medical users obtained prescription opioids. The largest source was from friends and family for free (38.2%). Approximately 11% reported obtaining prescription opioids from one doctor and 5% reported purchasing them from friends or family. Few individuals reported forging prescriptions or purchasing prescription opioids from drug dealers or off the internet. As can be seen, significant gender differences in two sources were revealed, with men being more likely than women to obtain

prescription opioids from family or friends, and to purchase prescription opioids from a drug dealer.

3.7 Type of Prescription Opioids Used

Examination of the specific types of prescription opioids used revealed that the most commonly reported were 1) hydrocodone products such as Vicodin, Lortab and Lorcet (70.7%); 2) codeine products such as Darvocet, Darvon or Tylenol with codeine (67.0%); and 3) oxycodone products such as Percocet, Percodan and Oxycontin (45.4%). Rates of codeine products were significantly higher among men than women ($p = .01$). No other significant gender differences were revealed.

3.8 Predictors of Non-Medical Use

We examined variables associated with prescription opioid non-medical use among men and women in the full sample (not including individuals who met criteria for abuse/dependence of prescription opioids). The following variables were significant predictors of prescription opioid non-medical use: male gender [adjusted odds ratio (AOR) 1.30, 95% CL 1.12–1.52], younger age [18–25 years vs. 35+ yrs old AOR 2.23, 95% CL 1.86–2.67], being employed [AOR 1.32, 95% CL 1.10–1.60], education [less than high school vs. college education AOR 0.70 95% CL 0.55–0.89], serious psychological distress [AOR 1.42, 95% CL 1.11–1.81], other past year substance use (i.e., alcohol [AOR 1.82, 95% CL 1.39–2.40], cigarettes [AOR 1.26, 95% CL 1.04–1.52], marijuana [AOR 2.66, 95% CL 2.22–3.19], heroin [AOR 3.95, 95% CL 1.34–11.66], cocaine [AOR 1.95, 95% CL 1.41–2.69], hallucinogens [AOR 1.59, 95% CL 1.20–2.10], stimulants [AOR 2.76, 95% CL 2.01–3.78] and tranquilizers or sedatives [AOR 15.75, 95% CL 11.22–22.11]) and meeting criteria for abuse/dependence on alcohol or illicit drugs [AOR 1.55, 95% CL 1.22–1.98]. Of note, the odds of using prescription opioids non-medically were 16 times higher among individuals who endorsed past year non-medical use of tranquilizers or sedatives.

Next, in order to explore what independent variables may be predictive of non-medical use within each gender subgroup we examined these predictors in separate logistic regression models stratified by gender. The findings revealed that among men, but not women, the following were significantly associated with prescription opioid non-medical use: 1) heroin, cocaine, and hallucinogen use; and 2) illicit drug or alcohol abuse/dependence (see Table 3). Among women, but not men, serious psychological distress and cigarette use were significantly associated with prescription opioid non-medical use. Interactions between gender and age, employment, education, serious psychological distress, cigarette use, alcohol use, marijuana use, non-medical stimulant use, non-medical tranquilizer use, or abuse/dependence on alcohol or illicit drugs were not statistically significant.

3.9 Predictors of Prescription Opioid Abuse or Dependence

Finally, we examined variables associated with meeting criteria for prescription opioid abuse/dependence among men and women in the full sample. The following variables were significantly associated with prescription opioid abuse/dependence: male gender [AOR 1.56, 95% CL 1.03–2.35], younger age [18–25 yrs vs. 35+ yrs old AOR 1.86, 95% CL 1.23–2.82], serious psychological distress [AOR 3.68, 95% CL 2.43–5.57], needle drug use [AOR 2.75,

95% CL 1.29–5.86], and other past year substance use (i.e., cigarettes [AOR 2.91, 95% CL 1.98–4.28], marijuana [1.88, 95% CL 1.17–3.02], cocaine [AOR 1.95, 95% CL 1.19–3.18], hallucinogens [AOR 2.17, 95% CL 1.25–3.77], tranquilizers or sedatives [AOR 28.25, 95% CL 16.86–47.34]). Notably, individuals who endorsed non-medical use of tranquilizers or sedatives were 28 times more likely to meet criteria for abuse/dependence.

We examined these predictors in separate logistic regression models stratified by gender in order to explore what independent variables may be predictive of non-medical abuse/dependence within each gender subgroup and found that among men, but not women, needle drug use and age were associated with prescription opioid abuse/dependence (see Table 4). Among women, but not men, cocaine, marijuana, and hallucinogen use were associated with prescription opioid abuse/dependence. Interactions between gender and employment, education, serious psychological distress, cigarette use, alcohol use, non-medical stimulant use, non-medical tranquilizer use, or abuse/dependence on alcohol or illicit drugs were not statistically significant.

4. Discussion

The current study extends the limited extant research on gender differences regarding prescription opioids. This study provides information from a more recent NSDUH than previous publications which is an important consideration when dealing with a growing public health problem. In addition, the study has unique value in that it addresses an important knowledge gap in the literature by 1) contrasting factors associated with non-medical use as compared to abuse/dependence, and 2) examining gender differences.

Using epidemiologic data from the 2006 NSDUH we found that approximately 14% of the sample endorsed lifetime and 5% past year non-medical use of prescription opioids, equating to population estimates of over 33 million (lifetime) and 12 million (past year) Americans (U.S. Census Bureau, 2009). Of relevance, 13.2% of past year non-medical prescription opioid users met criteria for abuse or dependence. Prevalence estimates drawn from earlier NSDUH epidemiologic surveys are substantially lower, highlighting the continuing rise in prescription opioid use in the United States (Zacny et al., 2003; Becker et al., 2008; Huang et al., 2006). For example, the 2002 NSDUH estimated a 12.6% lifetime and a 4.7% past year rate of non-medical use, which means that lifetime rates observed in the current study are higher by almost 4.0 million individuals and the past year rates are higher by approximately 1.7 million individuals. Moreover, the findings from this study demonstrate that rates of prescription opioid abuse or dependence increased approximately 17% from 2005 to 2006 (SAMHSA, 2007).

Gender comparisons of rates of non-medical use and abuse/dependence revealed marked differences, with men being 1.3 times more likely than women to report past year use and 1.6 times more likely to have abuse or dependence, when controlling for other confounders in the multivariable model. The current findings add to a mixed literature and are consistent with several other studies demonstrating higher rates of non-medical prescription opioid use and abuse among men (Becker et al., 2008; Huang et al., 2006; Tetrault et al., 2008; Carise et al., 2007; Banta-Green et al., 2009; Turk et al., 2008; McCabe et al., 2005), but contrasts

with other studies reporting higher rates among women (Green et al., 2009; Simoni-Wastila et al., 2004). Differences in estimated rates may be due, for example, to variations in methodology, nosology, time-frame assessed, age of participants, or setting (e.g., general population, treatment-seeking, college sample).

Treatment utilization was exceedingly low among both men and women. However, men reported significantly higher lifetime and past year rates of treatment utilization (11% lifetime, 5% past year) as compared to women (6% lifetime, 3% past year). Low rates of treatment-seeking among prescription opioid users may be due, in part, to the fear that treatment would mean relinquishing the rewarding effects of the opioids and, for those who have co-occurring pain syndromes, that they may experience an increase in pain. In addition, misguided beliefs and attitudes around the non-medical use of prescription opioids being relatively “safe” and the continued stigma surrounding addiction may deter potential treatment seekers (Blanco et al., 2007; Compton and Volkow, 2006; Zacny et al., 2003). Notably, only 2% of individuals who endorsed non-medical use of prescription opioids reported that their current or most recent substance abuse treatment was for prescription opioids. As the majority of men and women in the study who endorsed prescription opioid use reported polysubstance use, it may be that another substance of abuse was the primary “drug of choice” and therefore the aim of treatment. Alternatively, it may be related to a lack of available treatments targeting prescription opioids or access to such treatments. The data collected by the NSDUH does not allow us to address these possibilities. This is an area of importance for future research so that obstacles to treatment for prescription opioids may be elucidated and adequately addressed.

The source of prescription opioids used was also explored. Similar to earlier investigations (Green et al., 2009; McCabe et al., 2005) the most common sources were friends and family members. Gender-specific sources were observed with women being significantly more likely to obtain prescription opioids from friends and family, and men being more likely to purchase them from a dealer. Among a college-aged sample ($N = 4580$), McCabe et al. also showed that men were more likely to purchase prescription opioids from a dealer and women were more likely to obtain them from a parent. Among the general population ($N = 26,566$), Petersen et al. (2008) found that 29% of women admitted to borrowing or sharing prescription medications. These sources highlight potential gender-specific targets for prevention efforts. For example, although this is anecdotal evidence, women in our substance abuse clinic often report that their parent or grandparent has given them some of their prescription narcotic medications when they experience pain-related conditions such as a toothache or migraine headache. There is a need for better public education around the dangers of sharing prescription medications with friends and family members, as the potential for misuse and detrimental interactions with other medications or substances exists. Physicians and other professionals treating patients for pain need to advise all patients about these concerns when prescribing pain medications. Patients receiving pain medications should be alerted to never share their prescription medications with another family member or friend, and to keep their medications in a secure location in the home where children or others cannot reach them.

4.1 Non Gender-Specific Predictors of Non-Medical Use and Abuse/Dependence

As stated earlier, a limited amount of prior research has examined predictors of non-medical prescription opioid use, but no other study to our knowledge has contrasted predictors of use with predictors of abuse/dependence. Such information is important because effective strategies for different target groups (e.g., users vs. abuse/dependence) may differ. In the current study, several predictors were found to overlap. The following were associated with both non-medical use, as well as abuse/dependence: male gender, younger age, serious psychological distress, and other substance use. Needle drug use was associated with abuse/dependence, but it was not associated with non-medical use. Of particular note, logistic regression models for both non-medical use and abuse/dependence found that the strongest observed association was for the endorsement of non-medical use of tranquilizers and sedatives. In fact, individuals who endorsed non-medical use of tranquilizers or sedatives were 16 times more likely to report non-medical prescription opioid use and 28 times more likely to meet criteria for prescription opioid abuse/dependence.

Thus, individuals who endorse using other prescription drugs non-medically need to be screened for prescription opioid use. The use of multiple types of prescription drugs is of particular concern given the risk of potential drug interactions and overdose. The current findings suggest that efforts to decrease both prescription opioid non-medical use and abuse/dependence should target individuals under 34 years of age, males, individuals endorsing psychological distress or suffering from other comorbid mood or anxiety disorders, and individuals misusing other substances, especially other prescription drugs.

4.2 Gender-Specific Predictors of Non-Medical Use, Abuse or Dependence

In the examination of factors related to non-medical use and abuse/dependence, significant differences between men and women were observed, suggesting gender-specific pathways toward these two trajectories. Notable findings include the association of serious psychological distress and prescription opioid non-medical use among women, but not men. Using a treatment-seeking sample of opioid users ($N = 3,821$), Green and colleagues (2009) found, as did the current study, that women reported higher rates of psychological and psychiatric problems, as compared to men. It is well documented that women in the general population and among substance using subsamples evidence higher rates of some co-occurring psychiatric conditions (e.g., depression, anxiety) (Brady et al., 2009). Co-occurring conditions among substance using women need to be assessed and addressed in treatment, as they may be etiologically related since many women report using substances to “self-medicate” other psychiatric symptoms or negative affect (Brady et al., 2009). Cigarette use, which may correlate more strongly with psychological distress and the management of negative affect among women than men (Perkins, 2009), was also found to be associated with non-medical use among women but not men. In support of the current findings, data from the 2003 NDSUH (Tetrault et al., 2008), also found that among women, but not men, serious mental illness and cigarette use were significant predictors of past-year non-medical prescription opioid use.

In contrast to predictors of use, examination of predictors of abuse/dependence showed that serious psychological distress was as significant predictor for both men and women.

Previous research, including large epidemiologic studies and treatment-seeking populations, have also reported a positive association between psychological distress/mental health and prescription opioid use, abuse or dependence (Huang et al., 2006; Martins et al., 2009). For example, Becker et al. (2008) found that panic, social phobia, and agoraphobic symptoms were significantly related to prescription opioid abuse or dependence. While use may be less influenced by psychological distress for men than for women, it appears that abuse/dependence among men is influenced by distress. Irrespective of gender, clinical interventions and pharmacologic treatments aimed at targeting and mitigating psychological distress may serve an important preventative function.

4.3 Limitations

Several limitations common to survey studies warrant mention. Because the data were confined to non-institutionalized individuals aged 12 and older, the findings may not generalize to younger populations or institutionalized individuals. The items used for abuse and dependence in NDSUH were similar, but not exact, to those required by the DSM-IV for a formal diagnosis of substance abuse or dependence. For example, endorsement of recurrent problems was not required. The survey was self-report and formal diagnosis of abuse or dependence was not verified by clinician assessment, nor were objective data (e.g., urine drug screen tests) obtained. Also, this analysis is subject to the inherent limitations of all observational studies. Finally, the legitimate use of prescription opioids and the presence of pain syndromes or disorders were not assessed by the NSDUH. Despite these caveats, the current study has a number of unique strengths, including the fact that it is a large, nationally representative probability sample of the U.S. population aged 12 and older. In addition, “pill cards” which display the names and color photographs of various prescription opioids were used during assessment in order to facilitate accurate self-report. Finally, the findings add to the current literature by updating the knowledge base on prescription opiate misuse and dependence, examining differences in factors associated with non-medical use as compared to abuse/dependence, and examining these factors by gender.

5. Conclusions

The current findings reveal that prescription opioid non-medical use is a common and growing public health problem, with an estimated 33 million individuals reporting lifetime non-medical use and over 13% of current users having abuse/dependence. The findings help alert clinicians to characteristics that may confer greater risk of use or abuse/dependence, including male gender, younger age, serious psychological distress, and other substance use, in particular non-medical use of tranquilizers and sedatives. Given that young age is a consistent correlate of the initiation of non-medical prescription opioid use as well as abuse/dependence, urgent attention focused on adolescents and young adults is warranted (Compton and Volkow, 2006).

Treatment utilization was exceedingly low and more aggressive screening and preventative efforts are clearly needed to help slow what has been a continued rise in rates of use, abuse and dependence in the United States over the past decade. As yet, ideal treatments for prescription opioid abuse/dependence are unknown, and future scientific work is needed to

develop best practices in this area, including guidelines for the early detection of problematic use and the management of prescription opioid abuse/dependence (Compton and Volkow, 2006; Zacny et al., 2003). The current study found significant gender differences in several predictors of non-medical use and abuse/dependence and suggest potential avenues for enhancing the design of gender-sensitive prevention and treatment efforts.

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Table 1Demographic Characteristics (*N* = 55,279)

	Men <i>n</i> = 26,746	Women <i>n</i> = 28,533
Characteristics	% (<i>n</i>)	% (<i>n</i>)
Age		
12–17	10.86 (9355)	9.81 (8959)
18–25	13.82 (8619)	12.83 (9313)
26–34	14.65 (2641)	13.91 (2865)
35+	60.67 (6131)	63.45 (7396)
Race		
White	68.50 (17153)	68.40 (18292)
Black/African American	11.06 (3277)	12.56 (3788)
Hispanic	14.39 (4180)	12.83 (4300)
Other	6.05 (2136)	6.21 (2153)
Marital Status		
Married	54.53 (6471)	50.30 (7879)
Formerly Married	13.21 (1487)	22.98 (2770)
Never Married	32.26 (14202)	26.72 (13538)
Employment		
Employed	68.93 (15067)	57.04 (14737)
Unemployed	3.83 (1679)	3.13 (1419)
Not in Labor Force ^a	27.24 (10000)	39.83 (12377)
Education		
Less than high school	15.98 (3536)	13.82 (3159)
High School Graduate	27.70 (5971)	28.51 (6355)
College	45.45 (7884)	47.86 (10060)
12 to 17 year olds	10.87 (9355)	9.81 (8959)
Income		
Less than \$20,000	16.72 (5619)	21.27 (7021)
\$20,000–\$49,999	33.89 (9423)	25.04 (10204)
\$50,000–\$74,999	17.76 (4672)	17.42 (4721)
\$75,000 or More	31.63 (7032)	26.27 (6587)
Lifetime Non-Medical Prescription Opioid Use		
Yes	15.89 (4773)	11.18 (4271)
No	84.11 (21973)	88.82 (24262)
Past Year Non-Medical Prescription Opioid Use		
Yes	5.87 (2261)	4.18 (2020)
No	94.43 (24485)	95.82 (26513)

	Men <i>n</i> = 26,746	Women <i>n</i> = 28,533
Characteristics	% (<i>n</i>)	% (<i>n</i>)
Met Past Year Criteria for Prescription Opioid Abuse or Dependence		
Yes	0.74 (259)	0.58 (309)
No	99.26 (26487)	99.42 (28224)

^a12–17 year olds were not asked these questions.

Note. Results are reported as unweighted *n* and weighted percentages using SAS survey procedures. P-values were not included as the large sample size represented in this table generally leads to significant results in all cases, as was seen in this study.

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Table 2Sources of Prescription Opioids among Past Year Non-Medical Users ($n = 4,281$)

Source	% Yes (n)	p -value
Got it from a friend or relative for free		0.05
Men	20.45 (780)	
Women	17.75 (816)	
Total	38.20 (1596)	
Got a prescription from just one doctor		NS
Men	6.75 (218)	
Women	4.10 (203)	
Total	10.85 (421)	
Bought it from a friend or relative		NS
Men	2.98 (174)	
Women	2.11 (105)	
Total	5.10 (279)	
Took it from a friend or relative without asking		0.07
Men	1.75 (76)	
Women	2.04 (119)	
Total	3.80 (195)	
Bought it from a drug dealer or other stranger		0.001
Men	1.77 (85)	
Women	0.58 (39)	
Total	2.34 (124)	
Got a prescription from more than one doctor		NS
Men	0.45 (23)	
Women	0.29 (15)	
Total	0.74 (38)	
Stole it from doctor's office/clinic/hospital/pharmacy		NS
Men	0.06 (4)	
Women	0.07 (3)	
Total	0.13 (7)	
Wrote a fake prescription		NS
Men	0.07 (3)	
Women	0.01 (1)	
Total	0.08 (4)	
Bought it on the internet		NS
Men	0.05 (7)	
Women	0.01 (1)	

Source	% Yes (<i>n</i>)	<i>p</i> -value
Total	0.05 (8)	

Note. Results are reported as unweighted *n* and weighted percentages using SAS survey procedures. Totals do not add up to 100% due to unanswered questions, i.e. missing data, and to weighting.

NS: $p > .05$.

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Table 3

Logistic Regression Analysis of Characteristics Associated with Past Year Non-Medical Prescription Opioid Use, Stratified by Gender

	Men <i>n</i> = 26,746		Women <i>n</i> = 28,533	
Characteristic	AOR	95% CL	AOR	95% CL
Age Group				
18–25	2.20	1.75–2.76	2.32	1.78–3.02
26–34	1.62	1.20–2.19	1.60	1.13–2.28
35+	Ref	Ref	Ref	Ref
Employment				
Employed	1.35	1.04–1.75	1.31	1.03–1.67
Unemployed	1.22	0.69–2.15	0.91	0.50–1.65
Not in Labor Force ^a	Ref	Ref	Ref	Ref
Education^a				
High School Grad	0.75	0.54–1.03	0.83	0.57–1.21
College	0.68	0.48–0.97	0.70	0.48–1.03
< High School	Ref	Ref	Ref	Ref
Serious Psychological Distress				
Yes	1.26	0.85–1.85	1.65	1.24–2.18
No	Ref	Ref	Ref	Ref
Past Year				
Cigarette Use	1.24	0.95–1.60	1.29	1.03–1.61
Alcohol Use	1.70	1.22–2.36	1.86	1.26–2.75
Cocaine Use [*]	2.20	1.58–3.06	1.63	0.89–2.99
Marijuana Use	2.43	1.90–3.10	2.87	2.14–3.73
Heroin Use [*]	8.87	3.05–25.74	0.62	0.17–2.25
Hallucinogen Use [*]	2.09	1.55–2.82	0.97	0.59–1.60
Non-Medical Stimulant Use	2.12	1.30–3.44	3.93	2.51–6.17
Non-Medical Tranquilizer or Sedative Use	16.38	10.30–26.05	16.49	11.09–24.52
Illicit Drug or Alcohol Abuse or Dependence	1.71	1.26–2.32	1.35	0.89–2.04

^a12–17 year olds were not asked these questions.

Note: Non-significance is indicated if the confidence limit covers 1. AOR = Adjusted Odds Ratio. 95% CL = 95% Confidence Limits around the adjusted odds ratios.

^{*} Interactions tested in the overall parsimonious model were found to be statistically different ($p < .05$) by gender.

Table 4

Logistic Regression Analysis of Characteristics Associated with Past Year Prescription Opioid Abuse or Dependence, Stratified by Gender

	Men <i>n</i> = 26,746		Women <i>n</i> = 28,533	
Characteristic	AOR	95% CL	AOR	95% CL
Age Group[*]				
18–25	2.04	1.06–3.92	1.67	0.97–2.86
26–34	2.88	1.38–6.01	0.73	0.30–1.76
35+	Ref	Ref	Ref	Ref
Serious Psychological Distress				
Yes	3.92	2.16–7.12	3.32	1.93–5.73
No	Ref	Ref	Ref	Ref
Needle Use Ever of Any Drug				
Yes	2.84	1.16–6.94	3.16	0.90–11.08
No	Ref	Ref	Ref	Ref
Past Year				
Cigarette Use	2.64	1.51–4.60	3.32	1.64–6.75
Cocaine Use	1.77	0.91–3.45	2.47	1.16–5.25
Marijuana Use [*]	1.09	0.53–2.23	3.21	1.85–5.58
Hallucinogen Use	1.85	0.84–4.10	2.36	1.02–5.47
Non-Medical Tranquilizer or Sedative Use	52.48	26.26–104.87	15.81	9.09–27.50

^a 12–17 year olds were not asked these questions.

Note: Non-significance is indicated if the confidence limit covers 1. AOR = Adjusted Odds Ratio. 95% CL = 95% Confidence Limits around the adjusted odds ratios.

^{*} Interactions tested in the overall parsimonious model were found to be statistically different ($p < .05$) by gender.