

Polysubstance Use Among US Women of Reproductive Age Who Use Opioids for Nonmedical Reasons

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Objectives. To determine the prevalence and patterns of polysubstance use among US reproductive-aged women who use opioids for nonmedical purposes.

Methods. We used the National Survey of Drug Use and Health (2005–2014) data on female respondents aged 18 to 44 years reporting nonmedical opioid use in the past 30 days (unweighted $n = 4498$). We categorized patterns of polysubstance use in the past 30 days, including cigarettes, binge drinking, and other legal and illicit substances and reported prevalence adjusted for age, race/ethnicity, and educational attainment.

Results. Of all women with nonmedical opioid use, 11% reported only opioid use. Polysubstance use was highest in non-Hispanic White women and women with lower educational attainment. The most frequently used other substances among women using opioids nonmedically were cigarettes (56.2% smoked > 5 cigarettes per day), binge drinking (49.7%), and marijuana (32.4%). Polysubstance use was similarly prevalent among pregnant women with nonmedical opioid use.

Conclusions. Polysubstance use is highly prevalent among US reproductive-aged women reporting nonmedical opioid use.

Public Health Implications. Interventions are needed that address concurrent use of multiple substances. (*Am J Public Health.* 2017;107:1308–1310. doi:10.2105/AJPH.2017.303825)

Reproductive-aged women experienced a 400% increase in overdoses resulting from prescription opioid pain relievers between 1999 and 2010.¹ The increase in mortality has been concentrated among non-Hispanic White women,¹ those in rural areas, and those with lower socioeconomic status.² Increasing prevalence of opioid use disorder among women has been accompanied by an increase in adverse pregnancy and birth outcomes, including neonatal abstinence syndrome.^{3,4} Analysis of premature mortality in the United States suggests that public health gains in areas such as smoking cessation and HIV treatment have been offset among White adults by high rates of opioid-related deaths.⁵

Despite evidence of long-term effectiveness of substance use disorder treatment programs for women, a high unmet need exists for women-centered or pregnancy-

focused substance use disorder treatment.⁶ Recent public health policies have focused on improving access to treatment in and around the time of pregnancy; for example, the federal Comprehensive Addiction and Recovery Act includes grants for states to expand services for pregnant women and those women with dependent children. Limited evidence is available to inform this service expansion, because little is known about the prevalence and patterns of use of other

legal and illicit substances among women who use opioids for nonmedical purposes. Our objective was to determine the national prevalence of polysubstance use among reproductive-aged women with nonmedical opioid use and to assess patterns of polysubstance use.

METHODS

We used cross-sectional data pooled from 2005 to 2014 from the National Survey of Drug Use and Health (NSDUH). The NSDUH provides nationally representative estimates of legal and illicit substance use behaviors among the US civilian, noninstitutionalized population aged 12 years and older. The surveys are conducted in respondents' homes, including those in households (e.g., houses, apartments) and those in group quarters (e.g., shelters, migrant workers' camps); individuals with no fixed address are excluded. Survey methods incorporate procedures to protect confidentiality and encourage self-report of sensitive topics; for example, many questions are asked confidentially with computer-assisted interviewing methods.⁷ During the study period, the annual response rate for the survey ranged from 71% to 76%.⁷

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This study included female respondents aged 18 to 44 years who reported nonmedical opioid use in the past 30 days (weighted n = 13 065 951; unweighted n = 4498). Nonmedical opioid use was defined as use of an opioid pain reliever that was “not prescribed” or that was used “only for the experience or feeling it caused” or heroin use. Among all reproductive-aged women who responded to the NSDUH, a weighted 2% reported nonmedical opioid use in the past 30 days. We identified several subgroups of interest: Non-Hispanic White women, non-White and Hispanic women; women with a high school education or less; women with more than a high school education; and women who were pregnant at the time they responded to the survey.

We calculated, overall and among the subgroups, the proportion of women who reported using only opioids for nonmedical use. We assessed the use of cigarettes, alcohol, marijuana, cocaine, and hallucinogens and nonmedical use of stimulants and tranquilizers or sedatives in the past 30 days among women with nonmedical opioid use. Prevalence of use of each substance was individually assessed; use of each substance was not exclusive of other substances.

We used weighted multivariable logistic regression models to adjust prevalence estimates for age, race/ethnicity, and educational attainment. We calculated average predicted probabilities for reproductive-aged women, and for each subgroup, to report the prevalence of polysubstance use as percentages.

RESULTS

Among reproductive-aged US women with nonmedical opioid use, 10.8% reported only opioid use in the past 30 days (Table 1). Non-Hispanic White women had a lower predicted probability of reporting only opioid use versus polysubstance use, relative to non-White and Hispanic women (6.3% vs 19.8%). Women with a high school education or less had a higher predicted probability of reporting only opioid use relative to women with more than a high school education (13.2% vs 8.2%).

The most frequently used substance in the past 30 days among all reproductive-aged women with nonmedical opioid use was cigarettes (56.2%), although we observed

TABLE 1—Prevalence of Legal and Illicit Substance Use in the Past 30 Days Among US Reproductive-Aged Women Who Use Opioids for Nonmedical Reasons: National Survey of Drug Use and Health, 2005–2014

	All Women Aged 18–44 Years, No. or Predicted % (95% CI) ^a	Non-Hispanic White, No. or Predicted % (95% CI) ^b	Non-White and Hispanic, No. or Predicted % (95% CI) ^b	≤ High School Education, No. or Predicted % (95% CI) ^c	> High School Education, No. or Predicted % (95% CI) ^c	Pregnant, No. or Predicted % (95% CI) ^a
Sample size						
Weighted	13 065 951	8 937 003	4 128 948	6 692 679	6 373 272	205 979
Unweighted	4 498	3 040	1 458	2 505	1 993	101
Nonmedical opioid use only	10.8 (9.3, 12.5)	6.3 (5.0, 7.6)	19.8 (15.9, 23.6)	13.2 (10.8, 15.5)	8.2 (6.2, 10.0)	11.1 (9.4, 12.8)
Additional legal substances						
> 5 cigarettes/d	56.2 (52.0, 60.3)	65.3 (60.5, 70.2)	45.8 (38.2, 53.3)	69.4 (64.7, 74.1)	48.2 (42.5, 53.9)	42.0 (24.8, 59.2)
> 15 cigarettes/d	25.4 (21.4, 29.4)	32.3 (28.3, 36.3)	18.1 (10.7, 25.5)	34.9 (30.1, 39.8)	20.6 (15.7, 25.5)	15.2 (4.7, 25.7)
> 5 alcoholic drinks in 1 d	49.7 (46.4, 53.0)	51.4 (47.2, 55.5)	46.9 (41.4, 52.5)	50.8 (45.7, 55.8)	48.8 (44.4, 53.3)	51.2 (29.2, 73.3)
Other additional substances^d						
Marijuana ^e	32.4 (30.2, 34.7)	39.2 (36.1, 42.2)	21.6 (18.8, 24.5)	33.6 (30.4, 36.8)	32.0 (28.6, 35.3)	35.1 (20.7, 49.4)
Tranquilizers or sedatives ^f	22.2 (20.0, 24.4)	26.9 (23.9, 30.0)	14.8 (11.0, 18.6)	21.7 (18.5, 24.8)	23.0 (20.0, 26.1)	24.5 (10.0, 39.1)
Stimulants ^g	7.4 (5.8, 9.0)	8.7 (6.9, 10.6)	5.0 (2.3, 7.7)	6.9 (5.4, 8.5)	7.8 (5.2, 10.3)	6.6 (0.8, 13.9)
Cocaine ^h	9.4 (7.7, 11.1)	10.0 (8.0, 12.1)	8.0 (5.2, 10.9)	10.3 (8.2, 12.5)	8.3 (6.0, 10.6)	6.0 (1.0, 10.9)
Hallucinogens	3.8 (3.1, 4.5)	3.4 (2.6, 4.2)	4.3 (2.8, 5.9)	5.2 (3.8, 6.7)	2.8 (1.8, 3.7)	4.8 (0.1, 9.6)

Note. CI = confidence interval. Includes women aged 18–44 years who reported use of opioid pain relievers for nonmedical purposes or heroin use in the past 30 days between 2005 and 2014.

^aAverage predicted probabilities derived from weighted regression models controlling for age, race/ethnicity, and educational attainment.

^bAverage predicted probabilities derived from weighted regression models controlling for age and educational attainment.

^cAverage predicted probabilities derived from weighted regression models controlling for age and race/ethnicity.

^dNonmedical use of all substances listed.

^eExcludes marijuana as a legal substance because recreational use is illicit in most US states.

^fBenzodiazepines included as a tranquilizer.

^gIncludes methamphetamine or other stimulants.

^hIncludes crack and powder cocaine.

substantial variation in smoking status by race/ethnicity and educational attainment. An estimated 49.7% of all women with nonmedical opioid use reported having more than 5 alcoholic drinks in 1 day in the past month. Many women reported marijuana use (predicted probability = 32.4%) and use of tranquilizers or sedatives (22.2%). The distribution of polysubstance use was similar between the full sample and the subgroup of pregnant women with nonmedical opioid use (Table 1).

DISCUSSION

These findings indicate that polysubstance use is the norm, and not the exception, among US reproductive-aged women who use opioids for nonmedical purposes. Non-Hispanic White women and women with lower educational attainment had greater prevalence of polysubstance use. Importantly, polysubstance use is similarly highly prevalent among the subgroup of pregnant women reporting nonmedical opioid use. It is notable that the most frequently used substances in addition to opioids (cigarettes, alcohol, marijuana, and tranquilizers or sedatives) are legal in some or all cases and yet still may pose significant health risks, including during pregnancy.⁸ The high use of marijuana in our sample of women with nonmedical use of opioids is noteworthy, given the current scientific debate about risks and benefits of marijuana use. In light of policy changes around state marijuana legalization efforts, ongoing analysis is needed to determine the relation, if any, between marijuana policy and nonmedical opioid use among women. The estimated prevalence of cocaine use in our study (9.4% among all women) is also of concern, because cocaine use in pregnancy is associated with increased risk of placental problems.⁹

This study had limitations. First, these data relied on self-report of opioid use and other substance use, which may have underestimated the true prevalence. However, no other data sources would have provided nationally representative estimates of polysubstance use among reproductive-aged US women. Second, some respondents may have been unaware of their pregnancy status, which might have resulted in misclassification

of the pregnant subgroup in our study. Third, we pooled several years of data from the NSDUH to increase our study sample size, meaning that assessment of time trends was not possible. Fourth, the sample size of the subgroup of pregnant women with nonmedical use of opioids was very small, so estimates of use of specific substances varied considerably, and we were unable to distinguish mode of administration of opioids. Finally, data do not include individuals without a fixed address, meaning that we were not able to study homeless or transient women.

PUBLIC HEALTH IMPLICATIONS

Health risks for reproductive-aged women, including pregnant women, with nonmedical opioid use are likely to be affected by polysubstance use. Our findings suggest that interventions should address concurrent use of multiple substances among reproductive-aged women. Public health efforts to expand access to substance use disorder treatment as part of a comprehensive health care system or reform efforts at the federal, state, or local levels may provide important benefits to substance use disorder treatment rates among women and subsequent pregnancy outcomes.¹⁰ **AJPH**

CONTRIBUTORS

M. Jarlenski, A.J. Graves, and K. Kozhimannil conceptualized and designed the study. M. Jarlenski and A.J. Graves completed the statistical analysis. M. Jarlenski and K. Kozhimannil supervised the study. M. Jarlenski also drafted the article. All authors acquired, analyzed, or interpreted the data and critically revised the article for important intellectual content.

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HUMAN PARTICIPANT PROTECTION

Institutional review board approval was not needed because the study used de-identified, publicly available data.

REFERENCES

- Centers for Disease Control and Prevention. Vital signs: overdoses of prescription opioid pain relievers and other drugs among women—United States, 1999–2010. *MMWR Morb Mortal Wkly Rep.* 2013;62:537–542.
- King NB, Fraser V, Boikos C, Richardson R, Harper S. Determinants of increased opioid-related mortality in the United States and Canada, 1990–2013: a systematic review. *Am J Public Health.* 2014;104:e32–e42.

3. Jones HE, Martin PR, Heil SH, et al. Treatment of opioid-dependent pregnant women: clinical and research issues. *J Subst Abuse Treat.* 2008;35:245–259.

4. Patrick SW, Schumacher RE, Benneyworth BD, Krans EE, McAllister JM, Davis MM. Neonatal abstinence syndrome and associated health care expenditures: United States, 2000–2009. *JAMA.* 2012;307:1934–1940.

5. Shiels MS, Chernyavskiy P, Anderson WF, et al. Trends in premature mortality in the USA by sex, race, and ethnicity from 1999 to 2014: an analysis of death certificate data. *Lancet.* 2017;389(10073):1043–1054.

6. Terplan M, Longinaker N, Appel L. Women-centered drug treatment services and need in the United States, 2002–2009. *Am J Public Health.* 2015;105:e50–e54.

7. Center for Behavioral Health Statistics and Quality. 2014 National Survey on Drug Use and Health: Methodological Summary and Definitions. Rockville, MD: Substance Abuse and Mental Health Services Administration; September 2015. Available at: <http://www.samhsa.gov/data/sites/default/files/NSDUH-MethodSummDef62014/NSDUH-MethodSummDef62014.pdf>. Accessed November 4, 2016.

8. US Department of Health and Human Services. The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2014.

9. Wendell AD. Overview and epidemiology of substance abuse in pregnancy. *Clin Obstet Gynecol.* 2013;56:91–96.

10. Abraham AJ, Andrews CM, Grogan CM, et al. The Affordable Care Act transformation of substance use disorder treatment. *Am J Public Health.* 2017;107(1):31–32.