Published in final edited form as:

Drug Alcohol Depend. 2018 February 01; 183: 261–266. doi:10.1016/j.drugalcdep.2017.11.010.

Characteristics of drug use among pregnant women in the United States: Opioid and non-opioid illegal drug use

Verena E. Metz^{a,*}, Qiana L. Brown^{b,c}, Silvia S. Martins^b, and Joseph J. Palamar^d

^aFriends Research Institute, Inc., San Francisco, CA, USA

^bColumbia University, Mailman School of Public Health, Department of Epidemiology, New York, NY, USA

^cTrendologyIT Corporation, Baltimore, MD, USA

^dNew York University Langone Medical Center, Department of Population Health, New York, NY, USA

Abstract

Background—The opioid epidemic in the US is affecting pregnant women and their offspring, with rising numbers of maternal and neonatal treatment episodes. The aim of this study was to characterize pregnant drug users in order to inform intervention strategies based on sociodemographic, mental health, and substance use characteristics.

Methods—Data on pregnant women aged 18–44 reporting past-year, nonmedical opioid use or use of non-opioid illegal drugs (other than marijuana) were analyzed from the National Survey on Drug Use and Health (2005–2014). Women ($N = 818$) were categorized into 3 groups: 1) use of opioids only ($n = 281$), 2) opioid-polydrug users ($n = 241$), and 3) other (non-opioid) illegal drug users ($n = 296$). Characteristics between the 3 groups of women were compared using bivariable analyses.

Results—Most women were non-Hispanic White (67.6%), had a high school diploma or less education (61.0%), a household income $< \$20,000/\text{year}$ (72.2%), and health insurance coverage (84.3%). No significant differences between the three groups were found regarding sociodemographic characteristics. Past-30-day marijuana use was less prevalent among opioid-only users (10.9%) compared to opioid-polydrug users (43.6%) and other pregnant illegal drug users (27.6%) ($P < 0.001$) and past-year drug/alcohol treatment was less prevalent among opioid-only users (6.3%) compared to opioid-polydrug users (20.3%) and other illegal drug users (8.3%) ($P = 0.002$). Opioid-only users also reported lower prevalence of past-year depression ($P < 0.001$) and anxiety ($P = 0.039$).

*Corresponding author at: Friends Research Institute, 44 Gough Street, Suite 203, San Francisco, CA 94103, USA. vmetz@friendsresearch.org (V.E. Metz).

Contributors: All authors are responsible for this reported research. V. Metz conceptualized and designed the study. J. Palamar conducted the statistical analyses. V.E. Metz, Q. L. Brown, S. S. Martins, and J. J. Palamar drafted the initial manuscript, interpreted results, and critically reviewed and revised the manuscript. All authors approved the final manuscript as submitted.

Conflict of interest disclosures: None to report.

Appendix A. Supplementary data: Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.drugalcdep.2017.11.010>.

Conclusions—Pregnant drug-using women were often of low socioeconomic status, with mental health and substance use patterns suggesting the need for targeted mental health/substance use screening and interventions before and during pregnancy, particularly for opioid-polydrug users.

Keywords

Opioid abuse; Pregnancy; Polydrug use; Sociodemographic characteristics; Anxiety; Depression

1. Introduction

Opioid-related overdose deaths in the United States (US) have quadrupled since 1999, yielding approximately 78 deaths per day (Centers for Disease Control and Prevention, 2016). There has also been a surge in the number of infants born with neonatal abstinence syndrome (NAS) resulting from opioid use during pregnancy (Volkow, 2016), with associated hospital costs rising from \$732 M in 2009 to \$1.5 B in 2012 (Patrick et al., 2015). Given these recent developments, it is crucial to better understand trends in opioid use among pregnant women.

Numerous studies have reported a high prevalence of opioid use among women of childbearing age in the US (Jarlenski et al., 2017; Kozhimannil et al., 2017; Maeda et al., 2014; Martin et al., 2015; Ailes et al., 2015). Among pregnant women specifically, opioid use has been rising. For example, Desai et al. (2014) evaluated Medicaid data from 1.1 million women with completed pregnancies in the US and reported that 21.6% had filled a prescription for an opioid during pregnancy, with increases from 18.5% in 2000 to 22.8% in 2007.

Although studies report increases in opioid use during pregnancy in the US, they do not provide comprehensive information about this special population that would enable us to better characterize these women. This lack of information prevents us from identifying different subgroups of pregnant opioid users (differing in sociodemographic, mental health, and substance use profiles, and subsequently in their intervention needs), and thus, from developing more effective targeted prevention efforts, which may yield better maternal and child health outcomes. For example, polydrug users are more likely to exhibit more risk behaviors such as injecting opioids during pregnancy (Terplan et al., 2010), and thus, have unique treatment needs (McCarthy et al., 1999; Thaithumyanon et al., 2005). Opioid-polydrug use during pregnancy is associated with a myriad of adverse outcomes for mothers and infants, such as increased odds of maternal death during hospitalization, placental abruption, preterm labor, Cesarean delivery, transfusion and extended hospital stays > 7 days (Maeda et al., 2014). It is also associated with prematurity, low birthweight, congenital anomalies, greater likelihood of pharmacological treatment of NAS, longer hospital stays, and higher risks for developmental problems (Abdel-Latif et al., 2013). Importantly, the association between mental health and substance use disorders must not be neglected when developing more efficient intervention strategies for the reduction of drug use during pregnancy; mental disorders and substance use disorders do not only have mutually exacerbating effects, but also contribute individually and synergistically to adverse

pregnancy outcomes. For example, depression and anxiety are linked to inadequate nutrition and weight gain, increased alcohol and other substance abuse, poor adherence to perinatal care and adverse neonatal physical and behavioral outcomes (Biaggi et al., 2016).

Therefore, the aims of this study were to: 1) examine associations between sociodemographic characteristics, mental health characteristics, and substance use profiles in order to identify correlates of nonmedical opioid use (i.e., nonmedical only-opioid versus opioid-polydrug use) and non-opioid illegal drug use during pregnancy, and 2) estimate the prevalence of cigarette, alcohol, and marijuana use by pregnancy trimester and examine whether use is correlated with non-medical opioid and/or other illegal drug use.

2. Methods

2.1. Sample

The study included data from women aged 18–44 years from the National Survey on Drug Use and Health (NSDUH), years 2005–2014. The NSDUH is an annual, cross-sectional, nationally representative survey that assesses substance use and other behaviors among a probability sample of non-institutionalized individuals living in households within the 50 US states and District of Columbia ages 12 years and older (Substance Abuse and Mental Health Services Administration [SAMHSA, 2015]).

Surveys were administered via computer-assisted interviewing, conducted by an interviewer, and audio computer-assisted self-interviewing. Interviewers were trained to not view the screens during survey administration to maintain privacy and confidentiality, and to increase likelihood of honest reporting (Butler et al., 2011). All variables were self-reported.

Sampling weights were provided by NSDUH to account for unit- and individual-level non-response and adjusted to ensure estimates were consistent with estimates provided by the US Census Bureau. Aggregated data from all cohorts of pregnant women aged 18–44 who reported past-year, nonmedical opioid use and/or other non-opioid illegal drug use (other than marijuana) were examined ($N = 818$). Analyses were restricted to this subset of women, which is consistent with previous literature examining prenatal substance use among adults (Brown et al., 2017; Ko et al., 2015). The weighted interview response rates ranged from 71.2–76.0% annually.

2.2. Participant demographics and mental health and substance use variables

Women were asked if they were currently pregnant. Those indicating pregnancy were asked to specify trimester. Respondents were asked their age, race/ethnicity, annual family income, educational attainment, marital status, and whether they had health insurance or have received public assistance. They were also asked whether a doctor or medical professional had informed them that they had depression or anxiety, and whether they had received drug or alcohol treatment within the past year/their lifetime.

2.3. Substance use

Respondents were asked whether they had used various drugs in the “past year” (past 12 months) and in the “past month” (past 30 days/ “current use”). Specifically, they were asked

about use of cigarettes, alcohol, marijuana, LSD, cocaine, crack, PCP, ecstasy/MDMA, methamphetamine, heroin, *gamma*-hydroxybutyrate (GHB), ketamine, and DMT/AMT/Foxy, and nonmedical use of opioids, prescription stimulants, sedatives, and tranquilizers. Nonmedical use was defined as using a prescription drug that was not prescribed to the respondent or that she took only for the experience (SAMHSA, 2015). Respondents reporting past-year nonmedical opioid use were also assessed for past-year DSM-IV abuse and dependence (American Psychiatric Association, 1994).

To prevent underestimating fetal substance exposure, which may have a large impact on organ development very early in pregnancy (between embryonic weeks 3–8 (Niebyl and Simpson, 2008)), women who indicated any substance use within the past year were considered substance users.

2.4. Subgroups of pregnant drug users

We created a trichotomous past-year illegal drug use variable indicating: 1) nonmedical use of opioids (including heroin) only (regardless of marijuana use), 2) nonmedical use of opioids and use of at least one illegal drug (other than marijuana; including nonmedical use of prescription drugs), and 3) use of at least one illegal drug (other than marijuana; including nonmedical use of prescription drugs), but no opioid use.

Since the legal status of marijuana has changed over the study years and varies among the US states, marijuana is exempt from categories referring to illegal substance use only.

2.5. Analyses

We first examined descriptive statistics, and we then examined potential associations between covariates and the trichotomous drug use variable using chi-square tests. We also compared self-reported use of cigarettes, alcohol, and marijuana according to drug use category, by trimester, using chi-square tests. Analyses were weighted to account for the complex sample design and analyzed using Stata SE 13 (StataCorp, College Station, TX, 2009), which utilized Taylor series estimation methods to provide accurate standard errors (Heeringa et al., 2010). This analysis was exempt from IRB review at the New York University School of Medicine.

3. Results

3.1. User characteristics

Among pregnant women aged 18–44 years who reported past-year nonmedical opioid use and/or other non-opioid illegal drug use other than marijuana ($n = 818$), 36.8% ($n = 281$) used opioids only; 28.2% ($n = 241$) were opioid-polydrug users; and 35.0% ($n = 296$) used other illegal drugs.

3.2. Sociodemographic and mental health characteristics

Sociodemographic and mental health characteristics, and the relationship of these characteristics to drug use are presented in Table 1. The majority of the sample was aged 18–25 (60.6%), White (67.6%), and unmarried (66.2%). About a fifth (21.2%) reported ever

being in drug or alcohol treatment. Nearly half of the sample (45.5%) identified as current cigarette smokers, about a fifth (21.7%) reported past-month alcohol use; and a quarter (25.9%) current marijuana use.

Opioid-only use was more common in the third trimester than non-opioid illegal drug or opioid-polydrug use ($P = 0.0086$). Regarding mental health, more opioid-polydrug users reported both past-year depression ($P = 0.0005$) and anxiety ($P = 0.0385$) compared to the other women. Opioid-only users were less likely than the other two groups to report having been in drug or alcohol treatment (lifetime $P = 0.0002$, or past year $P = 0.0022$).

3.3. Use of cigarettes, alcohol, and marijuana

As shown in Table 1, cigarette, alcohol and marijuana use were lowest among opioid-only users. Nonmedical opioid use occurred more often among opioid-only users compared to the opioid-polydrug use group ($P = 0.0062$) which also included more opioid-dependent users ($P < 0.0001$).

Concomitant use of cigarettes, alcohol and marijuana according to trimester is reported in Table 2 (between user-group comparisons) and in Supplemental Table S1 (within-trimester comparisons). The opioid-only using group had the lowest substance use prevalence (except for smoking cigarettes in the past year, and current alcohol use in the third trimester), and the opioid-polydrug use group had the highest prevalence. Across the groups, there was an observable trend for smoking and drinking to decrease as pregnancy progressed. Supplemental Table S2 shows past-month and past-year illegal drug use.

4. Discussion

Our findings suggest that nonmedical opioid-using and non-opioid illegal drug-using pregnant women in the US have comparable socio-demographic characteristics, but differ regarding mental health problems and recent use of cigarettes, alcohol, and marijuana.

The majority of the sample was younger than 26 years, unmarried, had an annual household income below \$20,000, and predominantly White. Given that most pregnant women in the US receive their opioids from a physician (Kozhimannil et al., 2017), the characteristics of this sample may reflect disproportionate opioid-prescribing to White individuals (Pletcher et al., 2008). Thus, poor, young, unmarried, non-Hispanic White pregnant women seem vulnerable to nonmedical opioid and other illegal drug use during and around the time of pregnancy.

Regarding depression and anxiety, opioid-only using pregnant women had the lowest past-year and lifetime prevalence. Significant differences also emerged regarding recent substance use, suggesting more severe substance use among opioid-polydrug users. They were also more likely to have histories of problematic substance use as they considerably more often reported having been in treatment for alcohol or drug use compared to the other two groups. Almost a quarter of opioid-polydrug users were dependent, and 7% of opioid-only users abused opioids, suggesting an urgent need for opioid use disorder treatment and prevention interventions during pregnancy. However, it needs to be considered that mental

health conditions such as depression and anxiety are not independent from substance use; for example, Newport et al. (2012) found that depression and anxiety were linked to increased use of tobacco, alcohol and hypnotics use among pregnant women. Riskier polydrug and/or illegal drug use, as well as mental health problems, are also more likely to yield adverse health consequences during pregnancy (Madgula et al., 2011), and are also associated with poor prenatal care (El-Mohandes et al., 2003; Pereira et al., 2012). Although the three subgroups did not differ regarding health insurance status and the receipt of public assistance, we do not know if these women received adequate prenatal care; however, most potentially had access to prenatal care, which could be an opportunity to address their substance use.

4.1. Limitations

We could not determine whether self-reported past-year drug use occurred only before pregnancy or whether these women were aware they were pregnant when (continuing) using drugs. Furthermore, due to the study's cross-sectional design, causality cannot be inferred. In addition, there might be trends that could not be accounted for, such as that the proportion of non-opioid illegal drug using women decreased over time. Also, sensitivity analyses for past-month use could not be conducted due to too few women in many cells. This study only included non-institutionalized women, so individuals not included in the sample (e.g., homeless) may be underrepresented and results may be less generalizable to such populations.

4.2. Conclusions

Despite comparable sociodemographic characteristics among pregnant drug-using women in the US, opioid and non-opioid-using groups differed regarding mental health status and substance use severity. This calls attention to the need for access to mental health and drug use screening for women of childbearing age with low socioeconomic status, as well as for more targeted prevention efforts aimed at educating women of the risk of prepartal substance use, and the need for non-stigmatizing treatment approaches for women who misuse opioids and other illegal drugs during all stages of pregnancy.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

The authors would like to thank the National Institute on Drug Abuse of the National Institutes of Health for their funding. The authors would further like to thank the Inter-University Consortium for Political and Social Research for providing access to these data (<http://www.icpsr.umich.edu/icpsrweb/landing.jsp>). Verena Metz would also like to thank Barney Vaughan for helping in the final editing process.

Role of funding source: This research was supported by Grants of the National Institute on Drug Abuse (NIDA) of the National Institutes of Health under Award Numbers K01DA038800 (Palamar), T32DA031099 (Hasin), R01DA037866 (Martins). NIDA had no role in study design; collection, analysis, and interpretation of data; writing the report; and the decision to submit the report for publication.

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Table 1

Demographic and clinical characteristics of the 3 groups of pregnant women at time of survey completion.

	Full Sample (N =818) %	Opioid-Only Users (n =281) %	Opioid Poly-Drug Users (n =241) %	Other Illegal Drug Users (n =296) %	P
Demographic Characteristics					
Year ^a					0.5698
2005/2006	20.9	16.6	20.7	25.7	
2007/2008	22.1	19.5	23.9	23.3	
2009/2010	19.2	21.6	18.5	17.2	
2011/2012	19.0	21.1	15.7	19.6	
2013/2014	18.8	21.2	21.3	14.2	
Trimester at survey completion					
First	43.6	39.8	50.2	42.2	0.0086
Second	33.4	27.9	29.8	42.0	
Third	23.1	32.3	20.0	15.8	
Age					
18–25	60.6	57.5	63.5	61.5	0.5699
26–34	29.7	28.9	28.0	31.8	
35–49	9.7	13.6	8.5	6.6	
Race/Ethnicity					
White	67.6	63.2	73.4	67.6	0.5154
Black	12.0	14.0	11.3	10.6	
Hispanic	16.2	17.9	13.5	16.5	
Other	4.2	4.9	1.9	5.3	
Educational Attainment					
Less than High School	21.8	26.3	21.5	17.4	0.2220
High School	39.2	31.4	39.6	47.0	
Some College	24.5	26.1	28.3	19.7	
College or Higher	14.5	16.2	10.6	15.9	
Married					
No	66.2	58.3	80.3	63.3	0.0023
Yes	33.8	41.7	19.7	36.7	

	Full Sample (N =818) %	Opioid-Only Users (n =281) %	Opioid Poly-Drug Users (n =241) %	Other Illegal Drug Users (n =296) %	P
Annual household income					0.5659
< \$20,000	72.2	74.8	74.0	68.2	
> \$20,000	27.8	25.2	26.0	31.8	
Health Insurance					0.1640
No	15.7	13.4	21.9	12.9	
Yes	84.3	86.6	78.1	87.1	
Public Assistance					0.8034
No	89.5	89.7	87.9	90.6	
Yes	10.5	10.3	12.1	9.4	
Clinical Characteristics					
Depression (Lifetime)					0.0074
No	71.8	78.1	60.2	74.6	
Yes	28.2	21.9	39.8	25.4	
Depression (Past Year)					0.0005
No	83.1	89.4	70.9	86.2	
Yes	16.9	10.6	29.1	13.8	
Anxiety (Lifetime)					0.0906
No	79.8	82.7	72.4	82.7	
Yes	20.2	17.3	27.6	17.3	
Anxiety (Past Year)					0.0385
No	83.9	87.8	76.1	86.3	
Yes	16.1	12.2	23.9	13.7	
Ever Been in Drug/Alcohol Treatment					0.0002
No	78.8	90.0	64.9	78.3	
Yes	21.2	10.0	35.1	21.7	
Been in Drug/Alcohol Treatment in Past Year					0.0022
No	89.0	93.7	79.7	91.7	
Yes	11.0	6.3	20.3	8.3	
Cigarette Use in Past Year					0.0028
No	34.3	45.8	24.2	30.2	
Yes	65.7	54.2	75.8	69.8	

	Full Sample (N =818) %	Opioid-Only Users (n =281) %	Opioid Poly-Drug Users (n =241) %	Other Illegal Drug Users (n =296) %	P
Cigarette Use in Past Month					0.0026
No	54.5	66.8	42.7	51.2	
Yes	45.5	33.2	57.3	48.8	
Alcohol Use in Past Year					< 0.0001
No	17.3	28.9	9.3	11.4	
Yes	82.7	71.1	90.7	88.6	
Alcohol Use in Past Month					< 0.0001
No	78.3	88.9	62.0	80.2	
Yes	21.7	11.1	38.0	19.8	
Marijuana Use in Past Year					< 0.0001
No	49.8	74.8	25.5	43.2	
Yes	50.2	25.2	74.5	56.8	
Marijuana Use in Past Month					< 0.0001
No	74.1	89.1	56.4	72.4	
Yes	25.9	10.9	43.6	27.6	
Prescription Opioid Abuse or Dependence in Past Year					0.0323
No	80.7	85.2	74.8	—	
Yes	19.3	14.8	25.2	—	
Prescription Opioid Abuse in Past Year					0.0062
No	95.3	93.0	98.2	—	
Yes	4.7	7.0	1.8	—	
Prescription Opioid Dependence in Past Year					< 0.0001
No	85.5	92.3	76.6	—	
Yes	14.5	7.7	23.4	—	

^aThere was no significant difference in prevalence of type of drug use (using the full trichotomous drug use variable) across included NSDUH cohorts ($P = 0.5698$). However, separate tests for trends conducted for each of the three classes did reveal a significant decrease in prevalence of pregnant women identifying as users of other illicit drugs only ($P = 0.031$) over time.

Table 2

Past-year and past-month cigarette, alcohol, and marijuana use according to trimester among pregnant women who took the survey.

	Full Sample (N = 818) %	Opioid-Only Users (n = 281) %	Opioid Poly-Drug Users (n = 241) %	Other Illegal Drug Users (n = 296) %	P
Cigarette Use Past Year					
First Trimester	70.0	69.2	80.8	60.1	0.1020
Second Trimester	70.3	51.7	77.3	79.2	0.0093
Third Trimester	50.8	35.5	60.4	73.2	0.0154
Cigarette Use Past Month					
First Trimester	53.6	48.4	62.7	49.9	0.3741
Second Trimester	44.7	25.0	53.2	53.7	0.0076
Third Trimester	30.8	19.9	48.8	35.4	0.0274
Alcohol Use Past Year					
First Trimester	88.2	80.9	99.0	85.1	0.0011
Second Trimester	86.2	76.0	86.2	93.2	0.0294
Third Trimester	67.3	54.7	76.6	84.9	0.0279
Alcohol Use Past Month					
First Trimester	33.2	14.8	55.5	29.7	0.0001
Second Trimester	14.3	7.9	21.8	14.5	0.2531
Third Trimester	9.9	7.9	17.0	6.9	0.3359
Marijuana Use Past Year					
First Trimester	55.2	31.1	84.6	50.6	< 0.0001
Second Trimester	50.1	16.8	69.8	62.0	< 0.0001
Third Trimester	41.2	25.0	55.8	60.9	0.0047
Marijuana Use Past Month					
First Trimester	33.9	17.5	57.3	27.6	< 0.0001
Second Trimester	24.6	6.8	35.7	30.6	0.0075
Third Trimester	13.7	6.8	21.7	20.3	0.0278