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Substance Use During Pregnancy in New Mexico, 2016-2019

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The American College of Obstetricians and Gynecologists (ACOG) recommends avoiding the use of psychoactive substances during pregnancy.[1] However, an article by Branum and Ahrens[2] reports that, on average, women are unaware of being pregnant until five to six weeks into their pregnancy. This is a critical public health concern because substance use during pregnancy can lead to miscarriage, congenital anomalies, fetal alcohol spectrum disorders (FASDs), and neonatal abstinence syndrome (NAS), among others.[3-4]

New Mexico (NM) has been facing a substance misuse epidemic since at least the 1990s. NM has had the highest alcohol-related death rates in the United States (US) for decades and has also been, for many years, one of the states with the highest drug overdose death rates.[5] A report from the Centers for Disease Control and Prevention (CDC) revealed that, between 1999-2014, the number of pregnant women with opioid use disorder more than quadrupled in the US.[6] However, comprehensive data on substance use during pregnancy for NM have never been reported and therefore this report is both timely and important. The present report uses selected results from the NM 2016-2019 Birth Cohort Study, [still in process by the NM Department of Health (NMDOH)] to provide estimates of psychoactive substance exposure during pregnancy by New Mexican mothers who gave birth in NM between 2016-2019.

Methods

The study population comprises all babies delivered among NM resident mothers between 2016-2019. Birth certificates (BCs) were obtained from the NMDOH Bureau of Vital Records and Health Statistics to provide both the number of babies delivered as well as some substance use data. Other substance exposure data were obtained by linking the mother and infant (dyads) from the BCs to the NMDOH Hospital Inpatient Discharge Database (HIDD) (2015-2019), and the NM Board of Pharmacy (NMBoP) - Prescription Monitoring Program (PMP) Database, (2015-2019). For the latter, permission from the NMBoP was obtained to access the data. Data processing and analysis was performed using SAS 9.4®. Data linkage was performed using The Link King software with additional SAS processing.

For this analysis, *in utero* substance exposure was defined as any drug prescription provided to the mother during her pregnancy and/or any substance use as referenced by any previous hospitalization record(s) containing pertinent international classification of diseases, clinical modification (both ninth and tenth editions) diagnosis, procedure, and/or revenue codes. Using the delivery (birth) date, a search was conducted both on the PMP and HIDD and stratified by trimester. The last month of pregnancy (four weeks before birth) was also established as an exposure period. Exposures during this period were not included in the third trimester counts. Cases where the exposure period could not be ascertained were included in the category "non-specified period."

Comprehensive groups of substances analyzed included alcohol, tobacco and drugs [the latter includes six specific sub-categories such as cannabis, barbiturates, and opioids, etc. (see Table 1)]. Additionally, when possible, more specific drug groups were created, such as benzodiazepines (within the sedatives group), and amphetamines and cocaine (within the stimulants group). For the opioids group, two sub-categories were made: treatment and non-treatment. For this analysis, treatment was defined as prescriptions for buprenorphine (on the PMP) and/or procedure codes for pharmacological treatment of the mother with methadone, naltrexone, and/or naloxone.

If an exposure was identified but it was not possible to determine if the substance was alcohol, tobacco or a drug, it was considered a non-specified exposure. Within the drug group, any other drug that was not individually identified was put into the category "other drugs."

Analysis of *in utero* substance exposure data was performed by using the total number of births as the denominator. Analysis of substance use disorder treatment in mothers was performed by using the total number of mothers per birth event as the denominator. This means that a mother was counted only once in cases where multiple deliveries occurred for the same pregnancy. Upon completion and assessment of the linkages, all personal identifiers were removed.

Results

Between 2016-2019, there were 87,109 infants born in NM to 85,822 NM resident mothers. Some of these deliveries were for two or more infants. For these, the mother was counted once, which gave us a total of 86,974 mothers per birth event.

Of the infants, 34.9% were found to have been exposed to a psychoactive substance *in utero* (Table 1). This percentage remained consistent in each year of the study period (Figure 1). Over 90% of the BC dyads were matched with HIDD or PMP data. Of the infants exposed *in utero*, 57.1% were found to have been exposed to drugs, 38.8% to alcohol, and 31.1% to tobacco. For less than 1% of all exposed cases, the substance could not be specified (Table 1).

When exposure data were stratified by trimester, it was found that many cases had exposures in more than one trimester. Alcohol and tobacco represented the largest exposure groups during the first trimester. The percent of cases with an unspecified period of exposure was larger for alcohol exposures (86.1%). For tobacco and drugs these percentages were 31.2% and 3.6%, respectively. *In utero* exposures for alcohol and tobacco decreased between the first trimester and the last month (by 81% and 45%, respectively) but increased for drugs (60%). Polydrug exposure was very common, as was drug exposure during more than one of the pregnancy periods analyzed.

The highest *in utero* drug exposure (54.4%) happened during the last month of pregnancy. For the remaining periods, a decreasing level of exposure was observed as the delivery date approached. The other drugs group showed higher exposures during the last month, with 55.2% of all drug exposures falling into this category. Among drugs (excluding other drugs), opioids accounted for most of the exposures (49.0%), followed by cannabis (11.7%) and sedatives (9.8%) (Table 1).

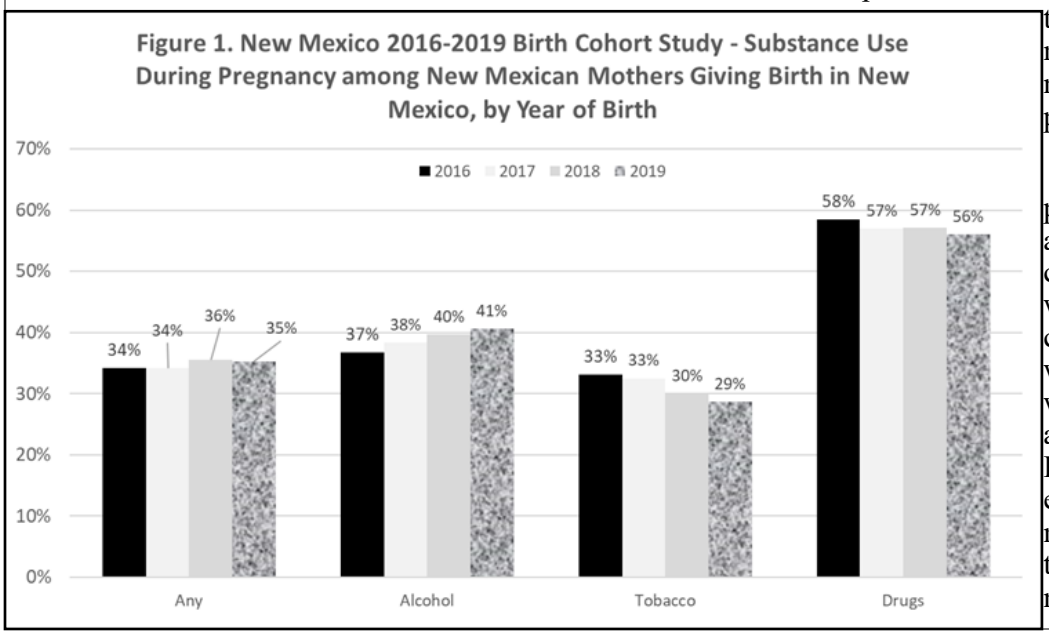
Amphetamines, cannabis, and cocaine exposures were higher during the last month of pregnancy compared to the first, second, and third trimesters. Benzodiazepine (which represented the vast majority of sedatives) exposure was the highest during the first trimester and the levels decreased as the delivery date approached, including the last month. Exposures to the other two major groups (stimulants and opioids) did not follow this decreasing pattern. Stimulant and opioid exposures decreased from the first trimester to the third trimester but increased again during the last month. However, the increase for opioids was not as high.

Exposure to opioids considered as treatment increased from the first trimester to the last month by 27%. Non-treatment opioid exposure exhibited the opposite trend (42% reduction). Some cases had both types of opioid exposures. Finally, 3.2% of mothers per birth event were on some kind of substance use treatment, with most of it as pharmacological treatment (99%).

Discussion

NMDOH has been conducting both morbidity and mortality surveillance of substance use, which has been a public health problem in NM for many years. This partial analysis of the NM 2016-2019 Birth Cohort Study combined data from BCs, PMP, and HIDD to assess substance use during pregnancy. Results showed that almost a third of pregnant women in our study population used substances during their pregnancies, and that almost all engaged in polysubstance use, which is inline with previous reports on substance use.[7-9] Further, this reinforces the positions of both CDC and ACOG that encourage women to engage in substance use treatment as soon as they become aware they are pregnant. Data presented here show high rates of exposure during the last month before delivery. That may be due to delay in seeking prenatal care, but that was not explored in this analysis.

Results also revealed that a small percentage of mothers (3.2%) with any substance use (alcohol, tobacco, and/or drugs) during pregnancy were on treatment. When that percent is recalculated among those who used drugs and among those who used opioids, the percentages are 5.6% and 11.5%, respectively. Results for treatment may be affected by the limited sources of treatment data for this study (namely, the PMP data and presence of pertinent codes in HIDD). At the nation-



al level, estimates on substance use during pregnancy can range from 4-40%, depending on the substance evaluated, which is consistent with our results.[10,11]

Data on substance use during pregnancy presents many challenges. First, while BCs were an important source of information, as they contain data on alcohol and tobacco use during pregnancy, there is some evidence that the NM Pregnancy Risk Assessment Monitoring System (PRAMS) survey may be a better source for these exposures.[12,13] PRAMS includes questions on substance use during pregnancy, is representative of the NM birth population, and is statistically weighted to adjust for non-response and potential bias. However, PRAMS was not used because it only includes a sample of births. Nonetheless, it is worth mentioning that NM PRAMS data from 2020 revealed that 44% of pregnant women with delayed prenatal care were not aware of being pregnant.[14] This delay may lengthen the period of substance exposure to the fetus. Another challenge with this analysis is data linkage, due to sometimes inconsistent values across datasets. For example, the mother's name could be entered as her maiden name in one database and as her married name in another database. Infants may be identified by the mother's name in various ways (i.e., Jane Doe's Boy, Newborn Male "NBM" Jane Doe) and later with their own first names but with either the mother's, father's or both last names combined in a different order.

There are several limitations to this analysis. First, data from the PMP reveal what prescriptions for controlled substances were filled but does not tell us whether they were actually taken. Most of the methadone is distributed by opioid treatment programs (OTPs) for medication -assisted treatment (MAT). OTPs do not report to the PMP, in accordance with the Substance Abuse Confidentiality Regulations 42 CFR Part 2, so data on treatment may be underrepresented. Second, although some cannabis exposure data could be obtained from HIDD, data on medical cannabis was not available. In NM, recreational cannabis commercialization did not start until April 2022. Finally, at the time of this report's publication, the effects of any substance during a non-specified period of exposure (representing 31.5% of the study population) could not be assessed.

Recommendations

Data presented here provide the first estimates of overall substance use exposure during pregnancy in New Mexico and therefore should provide baseline data for surveillance and future evaluation of trends. As such, these results could also serve as pre-implementation baseline data for the now-running Comprehensive Addiction and Recovery Act (CARA)–Plan of Care, which is a federally-funded effort seeking to offer services to families of infants born exposed to psychoactive substances.

Additionally, these results could be incorporated in education materials on the risks of substance use during pregnancy for women receiving substance use treatment or as part of family planning education. Finally, when the NM 2016-2019 Birth Cohort Study is completed, linkages with other data systems may allow for the assessment of the relationship between *in utero* substance exposures and outcomes such as mortality, NAS, birth defects, etc. This will provide a more complete picture of the health impact of *in utero* exposures and provide a stronger foundation to help inform decision making at different levels, like those related to prenatal care, substance treatment, and counseling.

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Table 1. New Mexico 2016-2019 Birth Cohort Study - Substance Use During Pregnancy among New Mexican Mothers Giving Birth in New Mexico

Substance	% study population	Period*				
		1st Trimester	2nd Trimester	3rd Trimester	Last Month	Non-specified Period
Any substance*	34.9%	36.4%	26.5%	27.0%	35.7%	31.5%
Alcohol**	38.8%	9.8%	3.0%	4.7%	1.9%	86.1%
Tobacco**	31.1%	56.5%	43.2%	53.1%	30.9%	31.2%
Drug**	57.1%	34.1%	25.4%	20.2%	54.4%	3.6%
Cannabis	11.7%	3.6%	3.2%	4.7%	92.1%	
Barbiturates	0.0%	0.0%	0.0%	0.0%	0.0%	
Hallucinogens	0.0%	0.0%	0.0%	0.0%	0.0%	
Stimulants	8.0%	49.8%	14.4%	10.8%	39.4%	8.7%
Amphetamines	38.9%	8.7%	8.0%	7.2%	81.4%	
Cocaine	6.4%	10.1%	11.2%	11.2%	73.0%	
Sedatives	9.8%	79.8%	28.1%	23.0%	19.3%	
Benzodiazepines	98.5%	81.1%	28.5%	23.4%	19.6%	
Opioids	49.0%	47.4%	37.4%	29.0%	29.6%	0.2%
Treatment	11.4%	56.8%	75.5%	73.0%	72.4%	
Non-treatment	96.5%	43.3%	30.6%	21.4%	25.2%	
Other drugs	55.2%	6.0%	9.7%	8.4%	72.5%	11.0%
Non-specified**	0.7%	0.0%	0.0%	0.0%	0.0%	100%
Treatment - All ***	3.2%	56.4%	75.3%	77.8%	72.4%	
Pharmacological	98.9%	57.0%	75.6%	78.1%	72.9%	

*Exposure was calculated using N=87,109 (infants born) as the reference.

**Alcohol, tobacco, drug, and non-specified drug percentages were calculated using the total number of exposed cases as denominator. For sub-groups (such as benzodiazepines or amphetamines), the percentage was calculated using their corresponding major group's percentage as reference. Period percentages are calculated using the total number of exposures per substance type.

***The reference for the calculation of percentage is N=86,974 (number of mothers per birth event). For calculation of the percentages by period, and for Pharmacological treatment, the reference is the total number on treatment. The reference for pharmacological treatment by period is the number of cases on pharmacological treatment.