



Prevalence of Polysubstance Use of Opioids in Pregnant Women and Medication-Assisted Treatment: Evidence From United States Treatment Episode Data Set

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OBJECTIVE

- Polysubstance use (PSU) is defined as ingestion of more than one drug of abuse within a defined period
- Prenatal PSU that involves the use of opioids in conjunction with various classes of non-opioid drugs is associated with adverse birth outcomes
- Limited research, however, exists on prenatal opioid-related PSU and potential treatment for the mother
- The purpose of this study was to (1) examine associations between PSU status and prenatal medication-assisted treatment (MAT) receipt among women with opioid use disorder (OUD) across different US regions; and (2) assess regional differences in factors that influence MAT receipt during pregnancy in this group of women

METHODS

- A cross-sectional study design was used to analyze data from the 2015-2019 Treatment Episode Data Set (TEDS)-Admission database
- The sample included 28,966 pregnant women between 18-49 years old living in the US with no history of prior treatment episodes or substance use disorder
- Descriptive analyses were conducted to describe the sample characteristics of pregnant women with OUD in four US regions including PSU status and MAT receipt
- Differences in correlates of MAT between pregnant women living in four US regions on sociodemographic factors, source of referral to MAT, and treatment-related measures were assessed
- Logistic regression analysis was conducted to examine (1) differences in MAT receipt across regions among women with OUD and PSU and (2) the effect of PSU and other correlates on MAT receipt among pregnant women with OUD by US regions

CONCLUSION

- Prevalence of PSU status and MAT among pregnant women with OUD varied across the four US regions, manifesting the need for region-specific public health policies and strategies for OUD treatment
- This study provides evidence of increased odds of MAT receipt in pregnant women with OUD who engage in PSU of opioids and stimulants regardless of US regions, sociodemographic factors of pregnant women, substance use disorder treatment-related factors, or source of referral to MAT
- Healthcare professionals and public health officials need to enhance or enact policies that target populations at risk (e.g., homeless, those working full time, etc.) for not receiving the necessary treatment OUD, regardless of the US region

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RESULTS

Table 1. Sample Characteristics of US Pregnant Women with Opioid Use Disorder Stratified By Regions

Characteristics	Entire US Regions n=28,966 %	Northeast n=4,197 %	Midwest n=4,996 %	South n=9,910 %	West n=9,863 %	P-value
<b>Substance Use</b>						<0.0001
Monosubstance Use (MSU)	82.8	82.3	85.1	80.7	84.0	
Polysubstance Use (PSU)	17.2	17.7	14.9	19.3	16.0	
<b>Age</b>						<0.0001
≤20 years	8.7	9.9	10.9	6.9	9.0	
21-29 years	61.1	59.5	60.9	64.1	58.9	
30-39 years	27.8	27.7	26.1	26.8	29.6	
≥40 years	2.4	2.9	2.1	2.2	2.5	
<b>Education</b>						<0.0001
No high school	32.6	31.4	33.2	30.8	34.8	
High school or GED	45.2	45.7	43.7	48.0	42.9	
College	22.2	22.9	23.1	21.2	22.3	
<b>Marital status</b>						<0.0001
Unknown	30.8	13.8	6.0	9.9	71.4	
Married	9.2	10.7	12.7	11.7	4.4	
Never married	50.5	67.5	67.3	64.4	20.8	
Separated/Divorced/Widow	9.5	8.0	14.0	14.0	3.4	
<b>Employment status at discharge</b>						<0.0001
Full-time	9.0	12.9	9.7	8.6	7.5	
Part-time	7.6	10.2	9.0	7.2	6.1	
Unemployed	40.0	30.2	40.1	53.7	30.3	
Not in labor force	30.9	42.0	24.9	23.6	36.4	
Unknown	12.5	4.7	16.2	6.9	19.7	
<b>Living arrangements at discharge</b>						<0.0001
Homeless	9.5	8.0	8.7	6.7	13.2	
Dependent living	18.0	11.6	18.4	20.9	17.5	
Independent living	58.9	76.6	55.6	63.4	48.8	
Unknown	13.6	3.8	17.2	9.0	20.5	
<b>Number of arrest in the 30 days prior to discharge</b>						<0.0001
None	82.5	90.8	86.5	84.1	75.3	
Once	4.4	4.2	4.5	4.9	3.9	
Two or more times	1.3	0.8	0.9	1.2	1.9	
Unknown	11.8	4.3	8.1	9.8	18.9	
<b>Treatment referral source</b>						<0.0001
Individual/Self	35.1	35.5	34.2	33.9	36.4	
Alcohol/Drug abuse	4.9	6.6	6.0	3.4	5.2	
Other health care	9.2	12.0	10.9	9.4	6.9	
Provider/School/Employer/EAP	24.1	22.6	20.3	25.7	25.2	
Other community referral	26.7	23.3	28.6	27.6	26.3	
<b>Service setting at discharge</b>						<0.0001
Detox Facilities	4.7	2.9	4.8	5.1	4.9	
Rehabilitative or residential facilities	23.6	12.8	26.3	26.3	24.1	
Ambulatory care facilities	71.7	84.3	68.9	68.6	71.0	
<b>Length of stay in treatment</b>						<0.0001
1 Month	12.8	4.6	5.5	27.9	4.9	
2-3 Months	49.8	48.3	58.5	48.0	47.9	
4-6 Months	17.1	20.3	17.7	12.5	20.0	
7-12 Months	11.7	14.1	11.0	7.6	15.0	
Over 1 Year	8.6	12.7	7.3	4.0	12.2	

Table 2. Unadjusted and Adjusted Odds Ratios for Medication-Assisted Therapy among Pregnant Women with Opioid Use Disorder and Polysubstance Use by Regions

	Medication-Assisted Therapy		P-value	Medication-Assisted Therapy Unadjusted OR (95% CI)	Medication-Assisted Therapy Adjusted OR* (95% CI)
	No n (%)	Yes n (%)			
			<0.0001		
<b>Entire US Regions</b>	23,126 (82.4)	4,947 (17.6)		3.27 (3.05, 3.50)	3.38 (3.10, 3.67)
<b>Northeast</b>	2,701 (66.7)	1,350 (33.3)		4.81 (4.06, 5.70)	5.23 (4.20, 6.53)
<b>Midwest</b>	3,721 (80.5)	901 (19.5)		3.22 (2.71, 3.83)	3.11 (2.50, 3.88)
<b>South</b>	8,301 (86.6)	1,281 (13.4)		1.87 (1.64, 2.14)	1.88 (1.59, 2.21)
<b>West</b>	8,379 (85.6)	1,409 (14.4)		5.36 (4.73, 6.08)	6.12 (5.18, 7.25)

\*Adjusted for sociodemographic factors including mothers' age, marital status, employment status, educational attainment, and other covariates such as sources of referral to treatment and medication-assisted therapy related measures.

Table 3. Correlates of Medication-Assisted Therapy among Pregnant Women Living in the US Stratified by Polysubstance Use of Opioid and Stimulant by Regions

Characteristics	Northeast (n=3,917)	Midwest (n=4,478)	South (n = 9,142)	West (n= 9,506)
	Medication-Assisted Therapy OR (95% CI)	Medication-Assisted Therapy OR (95% CI)	Medication-Assisted Therapy OR (95% CI)	Medication-Assisted Therapy OR (95% CI)
<b>Polysubstance Use Status</b>				
Monosubstance Use (MSU)**	Reference	Reference	Reference	Reference
Polysubstance Use (PSU)**	5.23 (4.20, 6.53)*	3.11 (2.50, 3.88)*	1.88 (1.60, 2.21)*	6.12 (5.18, 7.25)*
<b>Age at Admissions</b>				
20 Years or less	0.47 (0.26, 0.86)*	0.67 (0.33, 1.35)	0.12 (0.07, 0.23)*	1.06 (0.62, 1.81)
21-29 Years	1.42 (0.84, 2.38)	1.19 (0.63, 2.28)	0.55 (0.37, 0.82)*	1.85 (1.15, 2.95)*
30-39 Years	1.93 (1.14, 3.29)*	1.44 (0.76, 2.75)	0.58 (0.38, 0.87)*	1.77 (1.10, 2.83)*
40 Years or older	Reference	Reference	Reference	Reference
<b>Education</b>				
No High School	1.11 (0.89, 1.39)	1.18 (0.94, 1.48)	0.81 (0.66, 0.99)*	0.66 (0.55, 0.79)*
High School or GED	1.37 (1.12, 1.68)*	0.90 (0.73, 1.11)	1.05 (0.88, 1.26)	0.86 (0.73, 1.01)
College	Reference	Reference	Reference	Reference
<b>Marital status</b>				
Unknown	0.87 (0.63, 1.20)	0.93 (0.59, 1.46)*	0.30 (0.21, 0.44)*	0.72 (0.52, 0.99)*
Married	Reference	Reference	Reference	Reference
Never Married	0.83 (0.65, 1.06)	1.33 (1.03, 1.72)*	1.05 (0.85, 1.30)	0.66 (0.49, 0.89)*
Separated/Divorced/Widow	0.88 (0.61, 1.26)	0.80 (0.57, 1.11)	1.09 (0.84, 1.41)	0.51 (0.30, 0.87)*
<b>Employment Status at Discharge</b>				
Full-time	Reference	Reference	Reference	Reference
Part-time	1.11 (0.79, 1.54)	1.60 (1.03, 2.48)*	0.33 (0.25, 0.45)*	0.82 (0.55, 1.23)
Unemployed	1.93 (1.48, 2.53)*	2.97 (2.07, 4.28)*	0.33 (0.27, 0.40)*	1.72 (1.29, 2.30)*
Not in Labor Force	2.10 (1.62, 2.72)*	1.88 (1.29, 2.74)*	0.42 (0.38, 0.51)*	1.99 (1.49, 2.65)*
Unknown	3.14 (1.68, 5.85)*	2.31 (1.25, 4.28)*	0.38 (0.23, 0.64)*	1.91 (0.98, 3.72)
<b>Living Arrangements at Discharge</b>				
Homeless	0.69 (0.52, 0.94)*	0.53 (0.38, 0.75)*	0.64 (0.44, 0.92)*	0.89 (0.52, 0.93)*
Dependent Living	1.57 (1.15, 2.18)*	1.83 (1.31, 2.62)*	1.68 (1.09, 1.98)*	1.21 (0.80, 1.85)*
Independent Living	Reference	Reference	Reference	Reference
Unknown	0.45 (0.24, 0.84)*	0.39 (0.23, 0.65)*	1.38 (0.87, 2.19)	0.89 (0.52, 1.53)
<b>Number of Arrest in the 30 days Prior to Discharge</b>				
None	Reference	Reference	Reference	Reference
Once	3.31 (2.77, 3.96)*	1.45 (0.97, 2.16)	5.69 (4.47, 7.23)*	2.30 (1.62, 3.26)*
Two or More Times	0.53 (0.33, 0.85)*	1.31 (0.55, 3.08)	0.50 (0.15, 1.62)	1.11 (0.67, 1.86)
Unknown	0.68 (0.59, 0.78)*	0.71 (0.49, 1.02)	0.25 (0.19, 0.33)*	1.56 (0.93, 2.61)
<b>Treatment Referral Source</b>				
Individual/Self	Reference	Reference	Reference	Reference
Alcohol/Drug Abuse	0.91 (0.66, 1.24)	1.03 (0.75, 1.40)	0.32 (0.20, 0.52)*	0.89 (0.52, 0.91)*
Other Health Care	0.67 (0.53, 0.85)*	1.30 (1.03, 1.63)*	1.65 (1.35, 2.02)*	0.54 (0.43, 0.68)*
Provider/School/Employer/EAP	Reference	Reference	Reference	Reference
Other Community Referral	0.13 (0.10, 0.16)*	0.16 (0.11, 0.23)*	0.43 (0.36, 0.51)*	0.11 (0.09, 0.13)*
Criminal Justice	0.12 (0.10, 0.16)*	0.18 (0.12, 0.27)*	0.10 (0.07, 0.12)*	0.06 (0.05, 0.08)*
<b>Service Setting at Discharge</b>				
Detox Facilities	0.24 (0.13, 0.43)*	1.74 (1.26, 2.40)*	0.09 (0.05, 0.17)*	0.09 (0.05, 0.16)*
Rehabilitative or Residential Facilities	0.40 (0.29, 0.54)*	0.54 (0.43, 0.68)*	0.22 (0.18, 0.28)*	0.05 (0.03, 0.07)*
Ambulatory Care Facilities	Reference	Reference	Reference	Reference
<b>Length of Stay in Treatment</b>				
1 Month	0.76 (0.49, 1.16)*	0.96 (0.64, 1.44)	0.99 (0.85, 1.16)	0.35 (0.22, 0.56)*
2-3 Months	Reference	Reference	Reference	Reference
4-6 Months	0.95 (0.76, 1.18)	1.34 (1.05, 1.73)*	0.85 (0.67, 1.09)	0.97 (0.80, 1.18)
7-12 Months	1.83 (1.55, 2.16)*	2.57 (1.95, 3.35)*	1.17 (0.89, 1.54)*	1.25 (1.02, 1.53)*
Over 1 Year	4.51 (3.54, 5.75)*	5.31 (4.00, 7.06)*	2.59 (1.91, 3.53)*	2.75 (2.28, 3.30)*

\*p-value < 0.05

\*\*Pregnant women seeking for treatment of opioid use disorder who reported primary substance use as either opioids (all forms including heroin, non-prescription methadone, other opiates, synthetics) or stimulants (cocaine/crack, methamphetamine/speed, other amphetamines, other stimulants)

\*\*\*Pregnant women seeking for treatment of opioid use disorder who reported primary and secondary substance use as both opioids (all forms including heroin, non-prescription methadone, other opiates, synthetics) and stimulants (cocaine/crack, methamphetamine/speed, other amphetamines, other stimulants)

- Nearly 17.2% of the pregnant women with OUD were involved in PSU of opioids and stimulants across all US regions
- Pregnant women with OUD living in the South region had the highest prevalence of PSU (19.3%) as opposed to pregnant women with OUD living in the Midwest had the lowest prevalence of PSU (14.9%) with statistical significance (p-value < 0.0001)
- The majority of pregnant women with OUD were never married and were in the age group between 21-29 years old across entire US regions
- Nearly 58.9% of the pregnant women with OUD were living in an independent living arrangement while 82.5% of the pregnant women with OUD had no arrest history in the 30 days prior to discharge from treatment facilities across entire US regions
- The prevalence of MAT receipt was the highest in the Northeast region (33.3%) and the lowest was observed in the South region (13.4%)
- Pregnant women who engaged in PSU had higher odds (AOR=3.38, 95% CI: 3.10, 3.67) of receiving MAT relative to their MSU counterparts across all US regions
- Although PSU status was a significant predictor of MAT receipt across entire US regions, there was a notable difference in the size of the association (AOR) across four US regions
- The Southern region showed the lowest magnitude in the AOR (AOR =1.88, 95% CI: 1.59, 2.21) for the association between PSU status on MAT receipt. On the other hand, the Western region displayed the strongest association (AOR =6.12, 95% CI: 5.18, 7.25) between PSU status and MAT receipt
- Pregnant women with OUD who engage in PSU had higher odds of receiving MAT relative to their MSU counterparts in all four US regions with statistical significance (p-value < 0.05)
- Pregnant women with OUD with dependent living arrangements, arrested once 30 days prior to discharge, and with more than one year in length of stay at the treatment facilities had increased odds of MAT receipt across all US regions
- Overall, pregnant women with OUD working full-time, experiencing homelessness, being married, or being referred to a treatment center for reasons other than self-referral had lower likelihood of MAT receipt