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management preconception and during pregnancy for patients following bariatric surgery.

Table 1. Characteristics of pregnancies post-bariatric surgery and pregnancies in the matched control group

Demographic characteristic	Category	Cases (n=1,560)	Matched controls (n=7,383)	p-value
		Mean (±SD) or %		
Age at delivery (years)		34.1 (±4.6)	33.8 (±4.4)	0.020
Parity	Nulliparous	35.1	34.7	0.430
Pre-pregnancy body mass index	Normal weight	6.9	7.3	0.616
	Overweight	23.8	24.8	
	Class I Obesity	27.8	28.6	
	Class II Obesity	20.1	19.9	
	Class III Obesity	18.9	17.2	
	Missing/Unknown	2.5	2.3	
Race/Ethnicity	White	49.1	50.7	0.505
	Hispanic/Latinx	32.5	33.1	
	Black	9.9	9.0	
	Asian/Pacific Islander	4.4	4.3	
	Missing/Unknown	4.0	2.3	
Neighborhood Deprivation Index*	Quartile 1 (-2.38, -0.80)	12.6	12.1	0.890
	Quartile 2 (-0.81, -0.30)	24.4	24.2	
	Quartile 3 (-0.31, 0.32)	26.3	26.3	
	Quartile 4 (0.33, 4.85)	34.1	35.0	
	Missing/Unknown	2.7	2.3	
Pre-pregnancy medical conditions	Pregestational Diabetes Mellitus Type 2	8.0	2.5	<0.001
	Pre-existing Hypertension	11.5	8.1	<0.001

a. Quartiles of NDI are defined among the controls

Table 2. Pregnancy outcomes post-bariatric surgery compared with the matched control group

Pregnancy outcome	Category	Cases (n=1,560)	Matched controls (n=7,383)	Adjusted Risk Ratio (95% CI)*
		%	%	
Preterm birth (<37 weeks' gestation)		9.9	7.5	1.22 (1.02-1.45)
Hypertensive disorders of pregnancy	Gestational hypertension	6.5	6.9	0.90 (0.74-1.11)
	Preeclampsia	4.6	6.5	0.71 (0.56-0.90)
Mode of delivery	Cesarean birth	37.6	34.8	1.05 (0.97-1.13)
	Vaginal birth	62.4	65.2	
Gestational Weight gain per Institute of Medicine (IOM) guidelines	Outside IOM recommendations	81.6	78.3	1.05 (1.02-1.08)
Glucose Tolerance Status	Gestational Diabetes Mellitus or Impaired fasting glucose ^b	21.7	33.4	0.73 (0.67-0.81)
	Level III Neonatal Intensive Care Unit Admission	7.7	5.7	1.24 (1.01-1.52)
Birth weight for gestational age ^c	Large for gestational age	10.6	18.9	0.57 (0.49-0.66)
	Small for gestational age	10.8	6.4	1.56 (1.31-1.85)

- a. Adjusted for age at delivery, year of delivery, parity, pre-pregnancy body mass index, Neighborhood Deprivation Index, race/ethnicity, pregestational diabetes mellitus Type 2, pre-existing hypertension
- b. As diagnosed by nonstandard testing of fasting (>=95) or A1c (>=5.6). Only a small percentage of pregnancies post-bariatric surgery took the standard glucose tests during pregnancy, therefore we defined glucose tolerance status based on standard and non-standard tests
- c. Based on the sex-specific birth weight-for-gestational-age percentiles calculated using the Oken¹ cutoffs

334 Association between prenatal marijuana and tobacco smoke exposures and small for gestational age at birth

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OBJECTIVE: To determine the association of prenatal marijuana exposure with and without tobacco smoke exposure and small for gestational age (SGA) at birth.

STUDY DESIGN: We conducted a secondary analysis of singleton non-anomalous liveborn pregnancies in the prospective Lifestyle and Early Achievement in Families (LEAF) study, 2010-2016. We assessed marijuana use inclusive of any pregnancy urine specimen with a Δ9-THC-COOH concentration of > 15 ng/mL by mass spectrometry, self-report on questionnaire, and/or electronic health record; and self-

reported maternal tobacco use. Because of the high co-frequency of marijuana with tobacco exposure and the known association between tobacco and fetal growth restriction, we modeled the exposure as both marijuana and tobacco during pregnancy, only marijuana, only tobacco, and neither (reference). The primary outcome was SGA <10th percentile, and secondarily <5th percentile, per both parity- and sex-specific 2017 U.S. natality reference data. We used Poisson regression, and adjusted for maternal age, self-reported race and ethnicity, education, and pre-pregnancy body mass index.

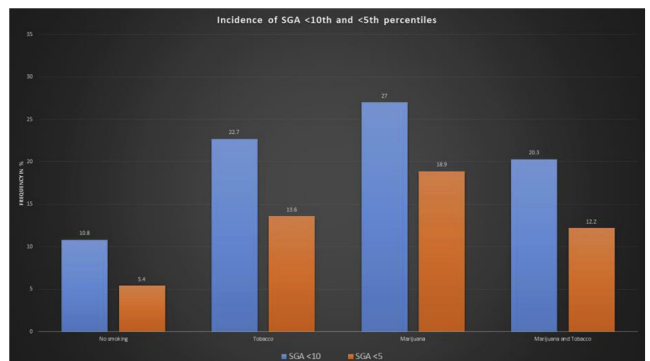
RESULTS: Among 325 assessed mothers, 11% had only prenatal marijuana exposure, 20% only tobacco exposure, and 23% both marijuana and tobacco exposure; and 17% of infants were SGA <10th percentile, parity-specific, and 15% were SGA <10th percentile, sex-specific. In adjusted analyses, both marijuana (27% vs. 11%; aRR: 2.58; 95%CI: 1.23 to 5.47) and tobacco (23% vs. 11%; aRR: 2.01; 95%CI: 1.02 to 3.97) were associated with a two-fold increased risk of SGA <10th percentile, parity-specific, compared to neither, but not with both marijuana and tobacco. These results were similar when using SGA <10th percentile, sex-specific. Secondly, marijuana increased the risk of SGA <5th percentile, parity-specific (19% vs. 5%; aRR: 3.63; 95%CI: 1.27 to 10.27).

CONCLUSION: Prenatal marijuana exposure in addition to tobacco may increase the risk of SGA. Further research is warranted to understand how in utero marijuana exposure may impact fetal growth.

Table 1. Association between prenatal marijuana exposure, tobacco smoke exposure, and small for gestational age (SGA) at birth

	Marijuana exposure (row percentage)		Unadjusted and adjusted analysis	
	Yes N (%)	No N (%)	Risk ratio (95% CI)	Adjusted risk ratio (95% CI)*
Primary analysis				
SGA <10 th percentile, parity-specific			1.00	1.00
No marijuana and no tobacco	16 (10.8)	132 (89.2)		
Only tobacco	15 (22.7)	51 (77.3)	2.10 (1.10, 3.99)*	2.01 (1.02, 3.97)*
Only marijuana	10 (27.0)	27 (73.0)	2.50 (1.23, 5.05)*	2.58 (1.23, 5.47)*
Both marijuana and tobacco	15 (20.3)	59 (79.7)	1.87 (0.98, 3.58)	1.69 (0.86, 3.42)
SGA <10 th percentile, sex-specific				
No marijuana and no tobacco	13 (8.8)	135 (91.2)	1.00	1.00
Only tobacco	14 (21.2)	52 (78.8)	2.41 (1.20, 4.85)*	2.36 (1.16, 4.80)*
Only marijuana	9 (24.3)	28 (75.7)	2.76 (1.28, 5.98)*	2.80 (1.24, 6.29)*
Both marijuana and tobacco	14 (18.9)	60 (81.1)	2.35 (1.06, 4.34)*	1.89 (0.91, 4.01)
Secondary analysis				
SGA <5 th percentile, parity-specific			1.00	1.00
No marijuana and no tobacco	8 (5.4)	140 (94.6)		
Only tobacco	9 (13.6)	57 (86.4)	2.52 (1.01, 6.25)*	2.27 (0.89, 5.81)
Only marijuana	7 (18.9)	30 (81.2)	3.50 (1.35, 9.04)*	3.63 (1.27, 10.27)*
Both marijuana and tobacco	9 (12.2)	65 (87.8)	2.25 (0.90, 5.69)	2.11 (0.80, 5.64)
SGA <5 th percentile, sex-specific				
No marijuana and no tobacco	9 (6.1)	139 (93.9)	1.00	1.00
Only tobacco	6 (9.1)	60 (90.9)	1.49 (0.55, 4.03)	1.28 (0.46, 3.56)
Only marijuana	6 (16.2)	31 (83.8)	2.66 (1.01, 7.03)*	2.74 (0.93, 8.08)
Both marijuana and tobacco	7 (9.5)	67 (90.5)	1.55 (0.60, 4.01)	1.30 (0.46, 3.74)

Poisson regression with robust error variance was used to calculate adjusted relative risk (aRR). *Adjusted models included: age, self-reported race and ethnicity, education, maternal pre-pregnancy body mass index. N=325 singleton non-anomalous pregnancies. Missing imputation: maternal pre-pregnancy body mass index (n=32), education (n=28), and age (n=4).



335 Characteristics of stillbirths during the Coronavirus 2019 (COVID-19) pandemic

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OBJECTIVE: Limited data about the impact of COVID-19 or altered provision of prenatal care during the pandemic on rate of stillbirth exists. We sought to determine the incidence and characteristics of stillbirths during the COVID-19 pandemic compared to that of stillbirths that occurred in the pre-pandemic period.

STUDY DESIGN: This is a retrospective cohort study of pregnant individuals who delivered stillbirths during two different time periods, March to September in 2017, 2018 and 2019 (pre-pandemic period) and March to September 2020 (pandemic period), at a large metropolitan hospital in a pandemic epicenter as designated by the Centers for Disease Control (CDC). Stillbirth rates were calculated as the number of cases per total number of live births. Comparisons were performed using Fisher's exact tests. A two-sided significance level of 0.05 was used for all statistical tests.

RESULTS: 9978 infants including 46 stillbirths and 3025 infants including 12 stillbirths were delivered during the pre-pandemic and pandemic periods, respectively. No difference in rate of stillbirths during the two time periods was found. Rates of co-morbid conditions in women who had a stillbirth were similar between the two periods. During the pandemic period, a higher proportion of stillbirths were suspected to be due to poorly controlled hypertension ($p = 0.04$). Maternal outcomes were similar between the two cohorts. For women who delivered during the pandemic period, 3 women (25%) had a SARS-CoV-2 PCR that was positive at the time of stillbirth.

CONCLUSION: The incidence of stillbirth during the pandemic period was similar to that during the pre-pandemic period. More stillbirths likely occurred due to poorly controlled hypertension, a potentially preventable cause of stillbirth, during the pandemic period. While the impact of the disease process of COVID-19 on stillbirth remains unknown, the disruption of the delivery of routine prenatal care during the pandemic period may have had unintended consequences with respect to the prevention and treatment of hypertension and the risk of potentially preventable stillbirths.

336 Clinical characteristics associated with need for intrapartum insulin infusion

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OBJECTIVE: Intravenous insulin infusions are used for glycemic control in labor and to support the postnatal transition in the setting of diabetes. We sought to determine clinical factors associated with a need for intrapartum insulin infusion.

STUDY DESIGN: This was a case-control study of pregnant patients with gestational (GDM) and pre-gestational diabetes (DM) who received care at a tertiary referral center over a ten-year period. Patients with a fetal anomaly, multiple pregnancy, or scheduled cesarean section were excluded. The primary outcome was treatment with an insulin infusion, which is started on Labor & Delivery per protocol if an hourly blood glucose during labor is greater than or equal to 120 mg/dL. Clinical characteristics were compared between groups using univariate regression. A multivariable regression model was used to examine associations between clinical characteristics and insulin infusion requirement. Results were stratified by diabetes type.

RESULTS: Of 704 patients meeting study criteria, 262 (37.22%) required an insulin infusion. Demographic characteristics were similar between groups except patients requiring an insulin infusion were more likely to have DM. The median final pregnancy total daily

insulin dose was not significantly different between those who received an insulin infusion (64 units/day; IQR 0-106) and those who did not (0 units/day; IQR 0-88). Hypertensive disorders of pregnancy were associated with the need for an insulin infusion overall (aOR 1.76; 95% CI 1.26-2.46) and among patients with DM (aOR 1.87; 95% CI 1.16-3.02). Patients with DM who were not on medication prior to pregnancy were significantly less likely to require an insulin infusion in labor (aOR 0.44; 95% CI 0.22-0.90). There were no differences for other clinical characteristics overall or by diabetes type.

CONCLUSION: Hypertensive disorders of pregnancy are associated with a significantly increased risk of requiring an insulin infusion during labor, while other clinical characteristics are similar between groups.

Table 1: Clinical characteristics associated with need for an intrapartum insulin infusion

	Insulin Infusion N=262 (37.22%)	No Insulin Infusion N=442 (62.78%)	All aOR (95%CI)* N=704	Pre-gestational Diabetes aOR (95%CI)* N=306	Gestational Diabetes aOR (95%CI)** N=384
Black race	182 (69.47)	272 (61.54)	1.29 (0.91-1.83)	1.02 (0.61-1.72)	1.53 (0.94-2.47)
Chronic hypertension	88 (33.59)	114 (25.79)	1.03 (0.71-1.51)	0.93 (0.56-1.55)	1.30 (0.73-2.31)
Pre-pregnancy diabetes medication					
None	135 (51.53)	300 (67.87)	0.66 (0.42-1.03)	0.44 (0.22-0.90)	---
Oral medication only	54 (20.61)	68 (15.38)	Ref	Ref	---
Insulin only	57 (21.76)	57 (12.90)	1.25 (0.73-2.14)	1.15 (0.65-2.03)	---
Oral medication and insulin	16 (6.11)	17 (3.85)	1.08 (0.49-2.37)	1.03 (0.45-2.36)	---
Hypertensive disorders of pregnancy	125 (47.71)	138 (31.22)	1.76 (1.26-2.46)	1.87 (1.16-3.02)	1.53 (0.94-2.50)
Large for gestational age (birthweight >90 th %)	54 (20.61)	79 (17.87)	1.16 (0.77-1.74)	0.82 (0.44-1.52)	1.49 (0.86-2.59)

Data are presented as n (%). aOR was calculated with multivariable binary logistic regression

*Adjusted for variables in table, obesity (BMI≥30), and total prenatal insulin dose closest to delivery

** Adjusted for race, chronic hypertension, hypertensive disorders of pregnancy, large for gestational age, obesity (BMI≥30), and total prenatal insulin dose closer to delivery

337 The Childbirth Experience Survey (CBEX) and COVID-19: the ABCs of vaccine hesitancy in postpartum people

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OBJECTIVE: In collaboration with community research partners and patients, we developed a set of COVID-19 specific questions to capture the childbirth experience (CBEX) of people who gave birth during the pandemic. The survey solicited anonymous responses from postpartum people in the U.S. who gave birth in a hospital, birth center or home. There was no incentive for participation and was primarily promoted online via paid Facebook advertisements.

STUDY DESIGN: This was a cross-sectional survey. We used an open coding technique in Atlas.ti to analyze qualitative survey responses to the question, "Why aren't you planning to receive the COVID-19 vaccine?"

RESULTS: A total of 4,393 postpartum surveys were completed between December 30, 2020 and June 30, 2021, and 1,434 people responded with 1,528 open-ended comments (participants could provide multiple comments). The following 3 themes accounted for 86% of the comments: 1) **Autonomy:** respondents cited personal choice, religious beliefs and anti-vaccine sentiment; 2) **Breastfeeding and fertility:** respondents emphasized a lack of research available to lactating people and limited information about effects on current and future pregnancies; 3) **Concerns about vaccine safety/fear and trust:** respondents expressed concerns about how quickly the vaccine was developed, unknown short and long term side-effects and unknown benefits versus risks. The remaining 14% of comments came from respondents who already received the vaccine or were undecided.