

## **ASSOCIATION OF IVF WITH SEVERE MATERNAL MORBIDITY IN LOW-RISK PATIENTS WITHOUT COMORBIDITIES**

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**Background:** In vitro fertilization (IVF) is a common assisted reproductive technology linked to higher complications. The CDC uses 21 indicators to identify Severe Maternal Morbidity (SMM) during childbirth, which include unexpected labor and delivery outcomes that result in significant consequences to a woman's health. The Obstetric Comorbidity Index (OB-CMI) assesses comorbidities affecting pregnancy outcomes. While IVF patients often have comorbidities, little is known about maternal health in low-risk, comorbidity-free IVF-conceived pregnancies. Studying this can inform clinical decisions and patient counseling.

**Objective:** This study aimed to investigate whether there is a difference in SMM between pregnancies following IVF versus unassisted conception in low-risk patients with an OB-CMI = 0. A secondary objective was to assess the risk of cesarean delivery between these groups.

**Material and Methods:** A retrospective cohort study conducted at a large integrated health system in New York. Study population included first pregnancies of patients who delivered in one of five hospitals between January 2019 and October 2022 and who had an OB-CMI score of 0, indicating an absence of pre-existing health conditions. Patients were categorized into two groups: IVF and non-IVF.

Data collected from electronic medical records included maternal demographics, mode of delivery, gestational age at delivery, SMM indicators, NICU admissions, and APGAR scores. The rates of SMM and cesarean section were calculated for both the IVF and non-IVF groups. Chi-square tests were conducted to determine if there was a significant difference in the primary outcome between the two cohorts. A p-value of <0.05 was considered statistically significant. Multivariable logistic regression analysis was used to examine the association between the groups.

**Results:** A total of 39,668 patients were included for this study: 454 IVF pregnancies and 39,214 non-IVF pregnancies. The study population was predominantly white, English speaking, and nulliparous (Table 1). The SMM rate of low-risk patients who conceived via IVF was 6.4%, compared to 2.4% among the non-IVF group; OR 2.84 (95% CI, 1.90-4.08 (Table 2). Cesarean delivery occurred more frequently in the IVF group compared to the unassisted conception group (36.6% vs 18.7%, respectively. OR 2.51 (95% CI, 2.07-3.04).

**Conclusions:** Our results indicate that among low-risk patients (OB-CMI = 0), patients undergoing IVF are two times more likely to experience SMM. OB-CMI score is positively associated with cesarean birth, yet even those with a score of 0 within the IVF population had a significantly increased rate of cesarean delivery. Cesarean sections carry risks and implications for maternal health, and maternal mortality occurs more frequently after cesarean birth than after vaginal birth. The higher rate of cesarean deliveries observed in the IVF population may contribute to their increased risk of SMM. Future studies could review the specific mechanisms

underlying this elevated SMM risk to aid healthcare providers and patients in making informed decisions regarding fertility treatments.

Table 1: Patient demographics

Characteristics	
IVF	
Yes	454 (1.1)
No	39,214 (98.9)
Public insurance	14,448 (36.4)
Maternal age, year	29.7±4.07
English language	35,696 (90.0)
Race/ethnicity	
American Indian or Alaska Native	257 (0.6)
Asian or Pacific Islander	5,813 (14.7)
Hispanic	7,798 (19.7)
Non-Hispanic Black	3,688 (9.3)
Non-Hispanic White	17,112 (43.1)
Other or multiracial	3,608 (9.1)
Declined or unknown	1,392 (3.5)
Parity	
0	23,066 (58.1)
≥1	16,602 (41.9)

Data are presented as mean ± standard deviation or number (percentage).

Table 2: Multivariable Logistic Regression Model

	SMM n=949	No SMM n=38719	Odds ratio (95% CI)
IVF			
Yes	29 (6.4)	425 (93.6)	2.84 (1.90-4.08)
No	920 (2.4)	38,294 (97.7)	1 (reference)
Parity			
0	695 (3.0)	22,371 (97.0)	1 (reference)
≥1	254 (1.5)	16,310 (98.5)	0.46 (0.39-0.54)
Race/ethnicity			
American Indian or Alaska Native	8 (3.1)	249 (96.9)	1.67 (0.75-3.20)
Asian or Pacific Islander	155 (2.7)	5,658 (97.3)	1.38 (1.12-1.68)
Hispanic	243 (3.1)	7,555 (96.9)	1.69 (1.39-2.06)
Non-Hispanic Black	100 (2.7)	3,588 (97.3)	1.44 (1.13-1.82)
Non-Hispanic White	311 (1.8)	16,801 (98.2)	1 (reference)
Other or multiracial	98 (2.7)	3,510 (97.3)	1.41 (1.10-1.78)
Declined or unknown	34 (2.4)	1,358 (97.6)	1.14 (0.76-1.65)
Health Insurance			
Not Public	497 (2.1)	22,776 (97.9)	1 (reference)

Public	406 (2.8)	14,042 (97.2)	1.37 (1.17-1.60)
Preferred Language			
Not English	119 (3.0)	3853 (97.0)	1 (reference)
English	830 (2.3)	34,866 (97.7)	0.97 (0.77-1.22)

\*Some data is missing for insurance

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