

# Black women have fewer maternal and neonatal complications in pregnancies conceived via in vitro fertilization

**OBJECTIVE:** Increased adverse maternal and neonatal outcomes are well-documented in non-Hispanic black compared to non-Hispanic white women in the United States. These include an increase in infant mortality, low birthweight, preterm deliveries, gestational diabetes mellitus, and hypertensive disorders of pregnancy.<sup>1,2</sup> Although these disparities

**TABLE 1**  
**Baseline demographic criteria of non-Hispanic White and non-Hispanic Black women who gave birth in the United States between 2016 and 2018**

Demographics	Non-Hispanic Black N = 7,721	Non-Hispanic White N = 108,963
<b>Maternal age (y)</b>		
<20	4 (0.1)	13 (0.01)
20–24	92 (1.2)	920 (0.8)
25–29	660 (8.6)	11,338 (10.4)
30–34	1,976 (25.6)	38,101 (35)
35–39	2,679 (34.7)	37,706 (34.6)
≥40	2,310 (29.9)	20,885 (19.2)
<b>Body mass index</b>		
Underweight <18.5	80 (1)	2,230 (2.1)
Normal 18.5–24.9	2,129 (27.6)	55,097 (50.6)
Overweight 25.0–29.9	2,642 (34.2)	27,418 (25.2)
Obesity index >30.0	2,870 (37.2)	24,218 (22.2)
<b>Total birth order</b>		
1	2,592 (33.6)	39,461 (36.2)
2	2,025 (26.2)	31,560 (29)
3+	3,104 (40.2)	37,942 (34.8)
<b>Payment</b>		
Medicaid	928 (12)	3,853 (3.5)
Private insurance	6,400 (82.9)	104,063 (95.5)
Self-pay	393 (5.1)	1,047 (1)
<b>Education</b>		
Less than high school	101 (1.3)	488 (0.5)
High school graduate	1,691 (21.9)	16,290 (15)
College	3,090 (40)	50,268 (46.1)
Masters degree or higher	2,839 (36.8)	41,917 (38.5)
Pregestational diabetes mellitus	173 (2.2)	957 (0.9)
Chronic hypertension	664 (8.6)	3,387 (3.1)
Previous preterm delivery	379 (4.9)	3,937 (3.6)
Smoking	35 (0.5)	543 (0.5)

Data are presented as number (percentage).

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are often attributed to differences in economic and social determinants of health, they were found to be persistent even after adjusting for these factors, suggesting possible biological bases.<sup>3,4</sup>

Pregnancies conceived by means of in vitro fertilization (IVF) represent a unique population, often with appropriate prepregnancy medical care, access to prenatal care, and overall higher socioeconomic status. We set out to assess whether the racial disparities described in the general population exist in this unique population of pregnancies following IVF in the United States.

**STUDY DESIGN:** We performed a retrospective analysis of the Centers for Disease Control and Prevention's (CDC) natality database (2016–2018) of births conceived via IVF in women who self-identified as non-Hispanic Black (Black) or non-Hispanic White (White). The Pearson's chi-square test was used to compare several pregnancy and neonatal outcomes among women of both races. Multivariate logistic regression adjusted the outcomes for potential confounders, including preexisting health determinants such as maternal age, body mass index, parity, pregestational diabetes

mellitus and hypertension, smoking status, and previous preterm deliveries and social determinants such as insurance status and level of education. The results are displayed as adjusted odds ratios (aOR) with 95% confidence intervals (CI). Statistical significance was set as a *P* value <.05. Institutional review board approval was not required, as the deidentified data are publicly available through a data use agreement.

**RESULTS:** A total of 8,485,531 births of non-Hispanic Black and White women were recorded in the US natality database during the study period. Of those, 1,788,197 (21%) were of Black women, and 6,697,334 (79%) were of White women. Overall 116,684 pregnancies were conceived via IVF (1.4%). Only 7,721 (0.4%) pregnancies of Black women were conceived via IVF compared with 108,963 (1.6%) pregnancies of White women (Table 1). After adjusting for confounders, the pregnancies of Black women conceived via IVF had a lower risk of gestational diabetes mellitus (aOR, 0.8; 95% CI, 0.7–0.9), hypertensive disorders of pregnancy (aOR, 0.8; 95% CI, 0.7–0.9), and eclampsia (aOR, 0.9; 95% CI, 0.9–1) than

TABLE 2

### Maternal and neonatal outcomes risk-adjusted for maternal age, body mass index, parity, insurance status, education, pregestational diabetes mellitus and hypertension, smoking status, and previous preterm deliveries

Outcomes	Non-Hispanic Black N = 7,721	Non-Hispanic White N = 108,963	Adjusted odds ratio	95% confidence interval	
<b>Maternal/pregnancy outcomes</b>					
Gestational diabetes mellitus	866 (11.2)	10,420 (9.6)	0.8	(0.7–0.9)	— <sup>a</sup>
Hypertensive disorders of pregnancy	1,067 (13.8)	14,803 (13.6)	0.8	(0.7–0.9)	— <sup>a</sup>
Eclampsia	57 (0.7)	488 (0.5)	0.9	(0.9–1.0)	— <sup>a</sup>
Preterm delivery	2,628 (34)	26,534 (24.4)	0.9	(0.8–1.1)	
Ruptured uterus	5 (0.1)	48 (0.04)	1.3	(0.3–6.0)	
Gravid hysterectomy	31 (0.4)	207 (0.2)	1.2	(0.6–2.5)	
Maternal admission to intensive care unit	76 (1.0)	451 (0.4)	1.3	(0.8–2.1)	
Multiple gestations	2,393 (31)	28,115 (25.8)	0.7	(0.6–0.7)	— <sup>a</sup>
<b>Neonatal outcomes</b>					
Low 5-min Apgar	381 (4.9)	2,890 (2.7)	1.3	(1.1–1.5)	— <sup>a</sup>
Neonatal intensive care unit admission	2,157 (27.9)	21,680 (19.9)	0.9	(0.8–1.0)	
Newborn antibiotics	645 (8.4)	6,224 (5.7)	1	(0.8–1.1)	
Immediate assisted ventilation	1,082 (14)	11,517 (10.6)	0.75	(0.7–0.8)	— <sup>a</sup>
Prolonged ventilation > 6 h	525 (6.8)	5,538 (5.1)	0.7	(0.6–0.8)	— <sup>a</sup>
Congenital malformation	25 (0.32)	449 (0.41)	0.8	(0.5–1.5)	
Chromosomal disorders	8 (0.1)	58 (0.05)	2.2	(0.6–7.8)	

Data are presented as number (percentage) unless otherwise indicated.

<sup>a</sup> Significant difference with *P* value <.05.

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White women (Table 2). Immediate and prolonged neonatal ventilation rates were also decreased (aOR, 0.7 and 0.75; 95% CI, 0.7–0.8 and 0.6–0.8; respectively) despite increased rates of a 5-minute Apgar score lower than 7 (aOR, 1.3; 95% CI, 1.1–1.5). No differences were found in the rates of preterm deliveries, maternal intensive care unit admissions, gravid hysterectomies, neonatal intensive care unit admissions, and administration of antibiotics to the newborn ( $P>.05$ ).

**CONCLUSION:** On the basis of this large-scale, nationwide US study, maternal and neonatal complications that are generally seen more frequently in Black women are, in fact, lower in Black than in White women in the unique IVF population. Previous studies suggested that biological variations are the primary source of this disparity,<sup>4</sup> and others described a multifactorial etiology, including limited access to education and healthcare and psychosocial stress, contributing to a long-lasting allostatic load.<sup>5</sup> By analyzing the outcomes in IVF pregnancies where patients have an overall higher socioeconomic status and better access to medical care, and by further adjusting for socioeconomic factors, education, smoking, and prepregnancy medical conditions, we found that the Black race was no longer associated with the higher risk described in the general US population. The dramatic change in the racial disparity of these complications in the IVF population suggests that the adverse outcomes described in Black women are not solely biological in nature and that the Black race may not be an independent risk factor. Instead, the causes are likely multifactorial, with an emphasis on social determinants of health and prepregnancy health conditions. Thus, given our findings in the IVF population, we believe that focusing on the social determinants of health and improved prepregnancy health conditions is key in eliminating the racial disparity noted in maternal and neonatal outcomes in the general US population. ■

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