

# Perinatal depression before and during the COVID-19 pandemic in New York City



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**BACKGROUND:** Quarantining and isolation during previous pandemics have been associated with higher levels of depression symptomatology. Studies in other countries found elevated rates of anxiety and/or depression among pregnant people during the COVID-19 pandemic compared with prepandemic rates. New York City was the initial epicenter of the pandemic in the United States, and the effects of the pandemic on perinatal depression in this population are not well known.

**OBJECTIVE:** This study aimed to evaluate the rates of perinatal depression before and during the COVID-19 pandemic.

**STUDY DESIGN:** This is a single-center retrospective cohort study of patients screened for perinatal depression with the Edinburgh Postnatal Depression Scale at 2 private academic practices in New York City. This screen is done in these practices at the time of the glucose challenge test and at the postpartum visit. Patients aged  $\geq 18$  years who completed a screen at a postpartum visit and/or glucose challenge test from February 1, 2019 to July 31, 2019 and from February 1, 2020 to July 31, 2020 were identified, and the 2019 and 2020 groups were compared. The primary outcome was a positive screen, defined as  $\geq 13$  and  $\geq 15$  for postnatal and prenatal screens, respectively. Secondary outcomes included monthly changes in rates of positive screens and factors associated with perinatal depression. Data were analyzed using Mann–Whitney U test, chi-square, or Fisher exact test, and univariate and multivariate analyses with  $P < .05$  defined as significant.

**RESULTS:** A total of 1366 records met the inclusion criteria; 75% of the prepandemic (2019) records were included, as opposed to 65% of pandemic (2020) records due to a lower screen completion rate in the pandemic cohort. The 2020 cohort had a higher proportion of Hispanic patients ( $P = .003$ ) and higher rates of diabetes mellitus ( $P = .007$ ), preterm labor ( $P = .03$ ), and current or former drug use ( $P < .001$ ). The 2019 cohort had higher rates of hypertension ( $P = .002$ ) and breastfeeding ( $P = .03$ ); 4.6% of the 2020 cohort had a suspected or confirmed COVID-19 infection. There was no difference in perinatal depression between the 2019 and 2020 cohorts (2.8% vs 2.6%;  $P > .99$ ). This finding persisted after adjusting for baseline differences (adjusted odds ratio, 0.89; 95% confidence interval, 0.38–1.86;  $P = .76$ ). There were no differences in rates of positive Edinburgh Postnatal Depression Scale by month. Several risk factors were associated with a positive screen, including being unmarried ( $P < .001$ ), pulmonary disease ( $P = .02$ ), depression ( $P < .001$ ), anxiety ( $P = .01$ ), bipolar disorder ( $P = .009$ ), and use of anxiolytics ( $P = .04$ ).

**CONCLUSION:** There were no differences in the rates of perinatal depression between the periods before and during the COVID-19 pandemic. The rate of perinatal depression in this cohort was below the reported averages in the literature. Fewer women were screened for perinatal depression in 2020, which likely underestimated the prevalence of depression in our cohort. These findings highlight potential gaps in care in a pandemic setting.

**Key words:** Edinburgh Postnatal Depression Scale, mental health, postpartum depression, quarantining

## Introduction

Perinatal depression (ie, depressive episodes that occur during pregnancy or

within the first year after delivery) affects 1 out of every 7 birthing people.<sup>1</sup> Psychosocial stress is a known risk

factor for perinatal depression.<sup>2</sup> At the beginning of the COVID-19 pandemic in the United States, many local

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This study was approved by the New York University Institutional Review Board, which granted a waiver of informed consent in accordance with 45 Code of Federal Regulations 46.116. Patient consent was not required because no personal information or details were included.

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## AJOG Global Reports at a Glance

**Why was this study conducted?**

This study was conducted to evaluate whether the COVID-19 pandemic was associated with an increase in the rate of perinatal depression.

**Key findings**

The COVID-19 pandemic was not associated with an increase in perinatal depression.

**What does this add to what is known?**

Previous studies from other countries had reported increased rates of postpartum depression with the COVID-19 pandemic. This study focused on a patient population in the initial epicenter of the COVID-19 pandemic in the United States, and adds to the growing body of literature on the effects of the pandemic on the mental health of pregnant and postpartum people.

governments issued stay-at-home orders, and health organizations strongly recommended quarantining and social distancing. As the pandemic unfolded, initially in New York City and eventually around the country, limitations were set on travel and hospital visitors—including transient no-visitor policies on labor and delivery units—likely affecting the pregnancy and postpartum experience of birthing patients.

Previous research on the psychological effects of quarantining has revealed an elevated risk of posttraumatic stress disorder (PTSD) and depression among quarantined participants. A 2004 study assessing psychological distress among quarantined persons during a severe acute respiratory syndrome (SARS) outbreak in Toronto found that nearly 30% of survey respondents exhibited symptoms of both PTSD and depression.<sup>3</sup> A study evaluating the psychological impact of the COVID-19 pandemic in China found that over half of 1200 respondents considered the psychological impact as moderate or severe, and approximately 17% reported moderate to severe depressive symptoms.<sup>4</sup> North American studies investigating the effects of the pandemic on maternal peripartum mental health have found similar results. A study surveying 900 pregnant and postpartum patients found that 40% of respondents had Edinburgh Postnatal Depression Scale (EPDS) scores consistent with postpartum depression.<sup>5</sup> Similar findings were noted among a different cohort when comparing

participants before and during the pandemic.<sup>6</sup> Patients with previous psychiatric diagnoses or of lower socioeconomic status were at even higher risk of elevated distress and psychiatric symptoms.<sup>6</sup> Other studies based in China, Turkey, Sri Lanka, Belgium, Italy, and Ireland have also found elevated rates of anxiety and/or depression among pregnant people during the pandemic compared with prepandemic rates.<sup>7–13</sup>

We sought to evaluate the rate of perinatal depression in a New York City population during the COVID-19 pandemic compared with the corresponding time period in the previous year.

**Materials and Methods**

This is a single-center retrospective cohort study of patients screened for perinatal depression with the EPDS at 2 private academic practices in New York City before and during the COVID-19 pandemic. The EPDS is a self-report questionnaire, which ranges from a score of 0 to 30.<sup>14</sup> Although initially designed as a screening tool for postpartum depression, it has been validated for use during pregnancy.<sup>15</sup> At these practices, EPDS are routinely administered at the time of the glucose challenge test (GCT) between 24 and 28 weeks of gestation and at the postpartum visit (PPV) 6 to 8 weeks after delivery. Birthing people aged  $\geq 18$  years who completed an EPDS at a GCT and/or PPV from February 1, 2019 to July 31, 2019 or February 1, 2020 to July 31, 2020 were included in this study.

Records missing delivery data or EPDS scores were excluded. Records with pregnancies during both study periods were also excluded.

The electronic medical record was queried for all patients who had either a prenatal visit for a GCT or a PPV during the study period. Charts were abstracted for demographic and clinical information, including age, parity, self-reported race/ethnicity, body mass index (BMI), medical and psychiatric comorbidities, and current medications. Delivery and neonatal information were also abstracted, including mode of delivery, delivery complications, and neonatal and maternal disposition. In 2020, the delivery hospital was designated to receive COVID-19 patients. Information on the EPDS—including score and week of gestation at time of completion (if administered antenatally)—was manually abstracted. RED-Cap (Research Electronic Data Capture; Vanderbilt University, Nashville, TN) was used for data management.

The primary outcome was a positive EPDS, defined as  $\geq 13$  for postnatal and  $\geq 15$  for prenatal screens. The validity of these cutoff values has previously been established in the literature.<sup>16</sup> Secondary outcomes included temporal changes in rates of positive depression screens and risk factors associated with a positive depression screen.

Approval for this study was obtained from the NYU Langone Health Institutional Review Board. Continuous variables were compared using the Mann–Whitney U test or *t*-test. Categorical variables were compared using chi-square or Fisher exact test. Multivariable logistic regression was used to adjust for covariates. Statistical significance was defined as  $P < .05$ . Analysis was performed using R, Version 4.0.2 (R Core Team, Vienna, Austria).

**Results**

A total of 1886 records were identified during the study period. Of these, 1366 (72.4%) met the inclusion criteria; 347 of 533 (65.1%) of the 2020 records met the inclusion criteria, as opposed to 1019 of 1353 (75.3%) of the 2019 records. Seventeen records were excluded because of

the patient having pregnancies in both study periods. The most common reason for exclusion for the remaining 503 charts was an absence of EPDS scores and a lack of visits during the study period. In 2019, there were 626 antenatal EPDS and 938 postnatal EPDS; in 2020, there were 240 antenatal and 310 postnatal EPDS. Patients in the 2020 cohort were more likely to identify as Hispanic, have a diagnosis of diabetes mellitus, and endorse a history of smoking or drug use (Table 1). Patients in the 2019 cohort were more likely to have a diagnosis of hypertension and a higher BMI, and to report a history of or current smoking or drug use. Importantly, there were no statistically significant differences in the prevalence of history of depression (7.7% vs 8.4%), anxiety (11.9% vs 12.1%), or reported use of antidepressants (13.5% vs 13.5%) between the 2019 and 2020 cohorts, respectively. Of the 2020 cohort, 4.6% had a suspected or confirmed COVID-19 infection.

The 2020 cohort had a higher incidence of preterm labor (2.6% vs 1.0%;  $P=.03$ ). No statistically significant differences were noted between the cohorts in the rates of peripartum complications, including hypertensive disorders of pregnancy, admission to the intensive care unit (ICU), and postpartum readmissions. Furthermore, no statistically significant differences were noted for gestational age at time of delivery, mode of delivery, delivery complications (including postpartum hemorrhage and chorioamnionitis), neonatal ICU admission, or perinatal death (Table 2).

To evaluate potential factors that conferred an increased risk of positive EPDS, a univariate analysis was performed. Risk factors associated with a positive EPDS include a history of depression ( $P<.001$ ), anxiety ( $P=.01$ ), bipolar disorder ( $P=.009$ ), pulmonary disease ( $P=.02$ ), use of anxiolytics ( $P=.04$ ), and being unmarried ( $P<.001$ ).

Among all patients screened for depression at any point in pregnancy or postpartum, there was no significant difference in the rate of positive EPDS between the 2019 and 2020 cohorts (Table 3). This finding persisted when depression screens were stratified by

timing—antepartum vs postpartum. The median antenatal EPDS score for both cohorts was 4; the median postpartum EPDS score for both cohorts was 3. A greater proportion of the 2020 cohort was screened for depression antenatally compared with the 2019 cohort (69.2% vs 61.4%;  $P=.001$ ). Conversely, a greater proportion of the 2019 cohort was screened in the postpartum period compared with the 2020 cohort (92.1% vs 89.3%;  $P=.12$ ), but this difference was not statistically significant.

Multivariate analysis was done to adjust for baseline differences between groups. After adjusting for reported ethnicity, breastfeeding status, BMI, history of hypertension, drug use, and preterm labor, there was no significant difference in the incidence of perinatal depression between the 2019 and 2020 cohort (adjusted odds ratio [aOR], 0.89; 95% confidence interval [CI], 0.38–1.86;  $P=.76$ ). However, when adjusting for history of diabetes mellitus, those with diabetes mellitus were more likely to have a positive EPDS during the pandemic (aOR, 2.6; 95% CI, 1.02–5.86;  $P=.03$ ). However, this relationship between diabetes mellitus and depression was not reiterated in a univariate analysis. There were no differences in rates of positive depression screen by month (Table 3). Given the small proportion of the 2020 cohort with a suspected or confirmed COVID-19 infection (4.6%), COVID-19 was not a risk factor.

Given the lower-than-expected rate of perinatal depression in our study population, a post hoc analysis was performed using an EPDS cutoff of  $\geq 11$ . This cutoff has previously been shown to have a sensitivity of 0.81 and specificity of 0.88 for detecting postpartum depression.<sup>17</sup> This analysis revealed higher rates of perinatal depression, but no significant difference in rates between cohorts (8.1% in 2019 vs 8.4% in 2020;  $P=.90$ ), which persisted after controlling for baseline differences between groups (aOR, 1.06; 95% CI, 0.66–1.66;  $P=.80$ ).

## Discussion

### Principal findings

We report that there was no difference in the rate of positive perinatal

depression screens for patients during the COVID-19 pandemic in 2 academic New York City practices compared with the corresponding time period in the previous year. Similarly, we found no difference in the rates of positive depression screens when stratified by month. The rate of positive depression screens in both cohorts was low (<3%) when a screen cutoff of 13 was used for postpartum screens and of 15 for antenatal screens. We identified a history of depression, anxiety, bipolar disorder, maternal pulmonary disease, anxiolytic use, and unmarried status as risk factors for a positive depression screen.

## Results

We have reported an unchanged rate of perinatal depression during the COVID-19 pandemic compared with prepandemic rates. Our findings are similar to those of previous studies evaluating prepandemic and pandemic cohorts in Japan and in the Netherlands.<sup>18,19</sup> Sade et al<sup>20</sup> found comparable risk for depression among hospitalized, high-risk pregnant patients during the pandemic relative to the period before the pandemic. A New York City study found no change in depression symptomatology between patients of higher socioeconomic status presenting for postpartum care before and during the pandemic.<sup>21</sup> Similarly, a systematic review of studies using only EPDS for depression screening found no statistical difference in depressive symptomatology.<sup>22</sup> Others have found that depressive symptoms in the setting of the pandemic may be less common in pregnancy. Yirmiya et al<sup>23</sup> found that pregnancy was associated with a reduced risk of depressive symptoms. Zhou et al<sup>24</sup> also noted that pregnant women had a reduced risk of symptoms of depression, anxiety, and PTSD compared with their nonpregnant counterparts. Silverman et al<sup>25</sup> also found lower depression symptomatology among their predominantly low-income, Black/Hispanic population seeking prenatal care during the pandemic.

Our findings differ from those of other cohort studies that have found higher rates of depressive symptoms

**TABLE 1**  
**Characteristics of the study population before and during the COVID-19 pandemic**

Characteristic	2019 N=1019	2020 N=347	P value
Age	34 (6)	34 (7)	.58
Residence <sup>a</sup>			.71
Manhattan	258 (25.8)	78 (22.5)	
Brooklyn	385 (38.5)	134 (38.7)	
Queens	131 (13.1)	50 (14.5)	
Bronx	27 (2.7)	13 (3.8)	
Staten Island	16 (1.6)	7 (2.0)	
Outside NYC	182 (18.2)	61 (17.6)	
Race <sup>a</sup>			.66
White	636 (65.1)	230 (66.5)	
Black	81 (8.3)	23 (6.6)	
Asian	127 (13.0)	41 (11.8)	
Other	133 (13.6)	52 (15.0)	
Ethnicity <sup>a</sup>			.003 <sup>b</sup>
Hispanic	104 (10.2)	43 (12.5)	
Non-Hispanic	858 (84.4)	297 (86.1)	
Other	54 (5.3)	5 (1.4)	
Married <sup>a</sup>	751 (86.8)	257 (88.3)	.46
Insurance			.74
Private	796 (78.1)	270 (77.8)	
Public	211 (20.7)	71 (20.5)	
Uninsured/unknown	12 (1.2)	6 (1.7)	
Non-English-speaking	14 (1.4)	5 (1.4)	>.99
Primiparous	578 (56.7)	181 (52.2)	.14
Breastfeeding <sup>a</sup>	874 (89.2)	282 (84.7)	.03 <sup>b</sup>
BMI	24.5 (6)	23.9 (7)	.007 <sup>b</sup>
Medical comorbidities			
Hypertensive disorders	117 (11.5)	20 (5.8)	.002 <sup>b</sup>
Diabetes mellitus	73 (7.2)	41 (11.8)	.007 <sup>b</sup>
Pulmonary disease	115 (11.3)	36 (10.4)	.64
Cardiac disease	36 (3.5)	37 (10.7)	.26
Depression	78 (7.7)	29 (8.4)	.67
Anxiety	121 (11.9)	42 (12.1)	.91
Bipolar disorder	6 (0.6)	4 (1.2)	.29
Other psychiatric diagnosis	31 (3.0)	11 (3.2)	.91
Psychiatric medication use			
Antidepressant	138 (13.5)	47 (13.5)	.99
Anxiolytic	41 (4.0)	22 (6.3)	.08
Antipsychotic	10 (1.0)	2 (0.6)	.74
Smoking status <sup>a</sup>			.23

(continued)

during the pandemic.<sup>26–29</sup> In a population of 135 participants, Perzow et al<sup>26</sup> found that one-third of respondents reported clinically significant levels of depressive symptoms—defined as  $\geq 10$  on the EPDS—as opposed to 15.5% before the pandemic. Gustafsson et al<sup>27</sup> reported similar findings. Similarly, Master et al<sup>28</sup> noted increased depressive symptoms during the pandemic among patients with a history of depression. These observations have also been corroborated by multiple systematic reviews.<sup>30–36</sup> Two systematic reviews and meta-analyses from China including >10,000 participants found pooled depression prevalence of 25% and 30%, respectively.<sup>30,31</sup> Similarly, a different review from Canada including 47,677 participants found a pooled depression prevalence of 25.6%.<sup>32</sup> Furthermore, a different meta-analysis found pooled prevalence of depressive symptoms of 27% and 17% for pregnant and postpartum participants, respectively.<sup>33</sup> Interestingly, this study did not find a difference in the prevalence of postpartum depressive symptoms between the prepandemic and the pandemic period.<sup>33</sup> Lastly, an integrative review evaluating protective and risk factors similarly found elevated rates of depressive symptoms, with prevalence ranging from 5.3% to 56.3%.<sup>34</sup> All of these meta-analyses had significant heterogeneity that was not explained by potential moderators explored.

The protective effect in our cohort may be partly mediated by the high rate of partnered patients. Although perceived partner support was not directly ascertained in this study because of its retrospective nature, it is likely that most of the study population did have some measure of partner support during the pandemic given that close to 90% of the cohort was partnered during the perinatal period. Partner support is a well-documented protective factor against depression in the perinatal period.<sup>2,23,34,37–39</sup> Private insurance, which may be reflective of higher income, is another possible factor mediating this protective effect in our cohort. This is supported by recent findings of high-income pregnant Canadians

**TABLE 1**  
**Characteristics of the study population before and during the COVID-19 pandemic** (continued)

Characteristic	2019 N=1019	2020 N=347	P value
Current smoker	12 (1.2)	2 (0.6)	
Former smoker	107 (10.9)	47 (13.7)	
Never smoker	865 (87.9)	293 (85.7)	
Drug use <sup>a</sup>			<.001 <sup>b</sup>
Current	9 (1.0)	1 (0.3)	
Former	23 (2.4)	29 (9.1)	
Never	912 (96.6)	289 (90.6)	

Data written as number (percentage) or median (interquartile range).

BMI, body mass index.

<sup>a</sup> Total number differs because of unknown/missing values; <sup>b</sup> Statistically significant.

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**TABLE 2**  
**Delivery outcomes**

Outcome	2019 N=1019	2020 N=347	P value
Gestational age at delivery	39.3 (1.7)	39.3 (1.6)	.93
Preterm birth	74 (7.3)	28 (8.1)	.62
Mode of delivery <sup>a</sup>			.87
SVD	600 (60)	202 (58.6)	
CD	327 (32.7)	121 (35.0)	
OVD	39 (3.9)	10 (2.9)	
VBAC	34 (3.4)	12 (3.5)	
Postpartum hemorrhage <sup>a</sup>	47 (4.7)	12 (3.4)	.34
Blood transfusion <sup>a</sup>	41 (4.1)	16 (4.6)	.68
Chorioamnionitis <sup>a</sup>	34 (3.4)	5 (1.4)	.06
Gestational hypertension	42 (4.1)	16 (1.6)	.70
Preeclampsia	22 (2.2)	7 (2.0)	.99
Preeclampsia with severe features	52 (5.1)	18 (5.2)	.95
Placental abruption	2 (0.2)	2 (0.6)	.27
Fetal growth restriction	28 (2.7)	4 (1.2)	.10
Preterm labor	10 (1.0)	9 (2.6)	.03 <sup>b</sup>
Preterm premature rupture of membranes	23 (2.3)	8 (2.3)	.99
ICU admission	5 (0.5)	1 (0.3)	.99
Postpartum readmission	30 (2.9)	9 (2.6)	.85
Neonatal ICU admission <sup>a</sup>	175 (17.4)	55 (15.9)	.46
Perinatal death <sup>a</sup>	5 (0.5)	0 (0)	.34

Data written as number (percentage) or median (interquartile range).

CD, cesarean delivery; ICU, intensive care unit; OVD, operative vaginal delivery; SVD, spontaneous vaginal delivery; VBAC, vaginal birth after cesarean delivery.

<sup>a</sup> Total number differs because of unknown/missing values; <sup>b</sup> Statistically significant.

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experiencing less distress and psychiatric symptoms during the pandemic compared with their low-income counterparts.<sup>6</sup>

Other possible factors mediating the low rate of perinatal depression include the racial composition of the cohort, which was predominantly White. Being a woman of color has been identified as a possible risk factor for depression during the COVID-19 pandemic.<sup>40,41</sup> In addition, the relatively older age of our cohorts may be partly mediating the low prevalence of depression given that previous studies have found that the risk of anxiety and depression during the COVID-19 pandemic is inversely correlated with age.<sup>7,42,43</sup> Greater resilience after disasters among pregnant people (compared with nonpregnant counterparts) has previously been described in the literature, which may have contributed to our low rate of positive screens.<sup>44</sup> Our low prevalence is also partly mediated by the prespecified cutoff scores that were used, as indicated by our post hoc analysis revealing a higher rate of perinatal depression when a cutoff of 11 was used. Additional proposed mechanisms mediating this decreased prevalence of depressive symptoms among pregnant people include increased contact with medical workers, increased emotional support from family, and improved baseline mental health leading up to conception.<sup>24</sup>

Our finding of asthma—the predominant pulmonary disease in our cohort—as an adjusted risk factor is in line with previous literature on the association between asthma and depression.<sup>45</sup> The mechanisms underlying these associations have not been fully elucidated, but include hormonal and inflammatory changes associated with both disease processes.<sup>45</sup> The prevalence of antidepressant use in our cohort—13.5%—is higher than the national prevalence of antidepressant use at any point in pregnancy (8.1%). Notably, although approximately 8% of the cohort endorsed a history of depression, nearly 12% reported a history of anxiety, which may be mediating the high rates of antidepressant use despite the lower rates of depression. This high rate of

TABLE 3

**Monthly and yearly rates of perinatal depression by Edinburgh Postnatal Depression Scale, 2019 vs 2020**

EPDS (antenatal, postnatal)	2019	2020	P value
	N=1019 (%)	N=347 (%)	
Any positive EPDS	29 (2.8)	9 (2.6)	>.99
	N=626 (%)	N=240 (%)	
Positive antenatal EPDS	12 (1.9)	2 (0.8)	.37
Median antenatal EPDS score	4 (0-23)	4 (0-19)	.47
	N=938 (%)	N=310 (%)	
Positive postnatal EPDS	28 (3.0)	8 (2.6)	.85
Median postnatal EPDS score	3 (0-24)	3 (0-17)	.55
	N=1019 (%)	N=347 (%)	
February	4/129 (3.1)	2/139 (1.4)	.43
March	5/200 (2.5)	2/77 (2.6)	>.99
April	6/201 (3.0)	0/17 (0)	>.99
May	6/219 (2.7)	0/11 (0)	>.99
June	4/132 (3.0)	2/38 (5.3)	.62
July	4/137 (2.9)	3/65 (4.6)	.68

Data written as number (percentage) or median (interquartile range).

EPDS, Edinburgh Postnatal Depression Scale.

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antidepressant use may be partly mediating our low prevalence of perinatal depression.<sup>46</sup> However, the data on the effectiveness of antidepressants for the prevention of postpartum depression are scant and have not demonstrated antidepressants to be prophylactic against postpartum depression.<sup>47</sup>

### Clinical and research implications

Considering the increase in COVID-19–related depression and anxiety observed in both pregnant and nonpregnant cohorts, it is reassuring that this relationship was not observed in our study population. Additional studies with more balanced cohort sizes are needed to confirm these findings. Clinicians should consider using lower EPDS cutoffs if they have the ability to facilitate evaluation of patients who screen positive, as evidenced by the increase in rates of perinatal depression when a lower cutoff was used.<sup>14</sup>

Further studies should evaluate the effect of antidepressant use on the risk

of perinatal depression given that almost 1 in 7 of our participants were on an antidepressant during pregnancy. Further studies may also consider investigating the risk of perinatal depression during the pandemic for patients with high-risk pregnancies. In addition, in light of the likely permanent increase in the use of telemedicine, further research into the feasibility of administering depression screenings virtually is needed.

### Strengths and limitations

Our study has several strengths and limitations. Strengths included its relatively large total sample size from a single center over the first 6 months of the pandemic and the corresponding time period in the previous year. Matching the months in the 2019 and 2020 cohorts may have accounted for seasonal variabilities in the rates of perinatal depression.<sup>48</sup> We excluded any records without information on mode of delivery, delivery complications, and neonatal/maternal disposition because

these are possible confounders. All chart-abstracted data were manually reviewed. We controlled for ethnicity, BMI, breastfeeding, maternal hypertension, maternal diabetes mellitus, drug use, and preterm labor, which were confounders in the study.

Limitations included the disproportionate size of the prepandemic cohort compared with the pandemic cohort. The small size of the 2020 cohort is partly due to the lower patient volume of our center during the pandemic, which was reflected in a lower delivery rate during the first half of 2020. In addition, information on whether prenatal or postpartum visits were in-person or virtual was not collected for the 2020 cohort and EPDS were not administered virtually. Thus, given that an exclusion criterion for the study was the absence of an EPDS score, it is possible that fewer patients met the inclusion criteria in 2020 because of fewer EPDS being administered in light of more patients receiving care via telemedicine. In addition, patients electing to use telemedicine instead of in-person visits may have inherent differences in their levels of anxiety and depression creating a selection bias. The introduction of telemedicine may have inadvertently resulted in underdiagnosis of perinatal depression. The EPDS is a screening tool and not a diagnostic tool; therefore, it is possible that some patients with depression are not being diagnosed. Furthermore, positive EPDS in this population were not consistently confirmed with a clinical evaluation, posing another limitation to the study. Lastly, self-report bias and underreporting may have affected the detection of depression in our cohort.<sup>49</sup>

### Conclusion

The rate of perinatal depression, as defined by a positive antenatal and/or postpartum EPDS, did not increase during the COVID-19 pandemic in our New York City practice. ■

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