Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

The association between the COVID-19 pandemic and postpartum care provision

Allie Sakowicz, MS; Chloe N. Matovina, BS; Sidney K. Imeroni, BA; Maya Daiter, BA; Olivia Barry, MD; William A. Grobman, MD, MBA; Emily S. Miller, MD, MPH

BACKGROUND: The COVID-19 pandemic led to a rapid transformation in the healthcare system to mitigate viral exposure. In the perinatal context, one change included altering the prenatal visit cadence and increasing the utilization of telehealth methods. Whether this approach had inadvertent negative implications for postpartum care, including postpartum depression screening and contraceptive utilization, is unknown.

OBJECTIVE: This study aimed to examine whether preventative health service utilization, including postpartum depression screening and contraceptive utilization, differed during the COVID-19 pandemic when compared with the prepandemic period.

STUDY DESIGN: This retrospective cohort study included all pregnant patients who received prenatal care at 1 of 5 academic obstetrical practices and who delivered at Northwestern Memorial Hospital either before (delivery from September 1, 2018, to January 1, 2019) or during (delivery from February 1, 2020, to May 15, 2020) the COVID-19 pandemic. Completion of postpartum depression screening was assessed by reviewing standardized fields in the documentation associated with the screening in the electronic health record system. The method of contraception used was ascertained from the postpartum clinical documentation. Patients were classified as initiating long-acting reversible contraception use if they received NEXPLANON (etonogestrel implant) or an intrauterine device during the hospitalization for delivery or within 3 months following delivery. Bivariable and multivariable analyses were performed.

RESULTS: Of the 2375 pregnant patients included in this study, 1120 (47%) delivered during the COVID-19 pandemic. Pregnant patients who delivered during the COVID-19 pandemic were significantly less likely to have undergone postpartum depression screening (45.5% vs 86.2%; $P<.01$); this association persisted after adjusting for potential confounders (adjusted odds ratio, 0.13; 95% confidence interval, 0.11–0.16). Pregnant patients who delivered during the COVID-19 pandemic also were significantly less likely to initiate long-acting reversible contraception use within 3 months of delivery (13.5% vs 19.6%; adjusted odds ratio, 0.67; 95% confidence interval, 0.53–0.84).

CONCLUSION: The onset of the COVID-19 pandemic was associated with a decrease in the completion of postpartum depression screenings and fewer patients initiating long-acting reversible contraception use overall. These results can inform adaptations in healthcare delivery in the midst of the ongoing COVID-19 pandemic.

Key words: contraception, COVID-19 pandemic, depression screening, health services, LARC, long-acting reversible contraception, postpartum depression

Introduction

The COVID-19 pandemic has dramatically altered public health and healthcare delivery both in the United States and globally.[1] Specifically, healthcare systems have instituted many changes in healthcare delivery to minimize the risk of COVID-19 transmission to healthy patients and healthcare workers. Such changes in the obstetrical setting include paring down the frequency of antenatal visits and shifting visits to telehealth consultations, including for postpartum care. Although this approach is necessary to limit viral spread, these healthcare system changes may have negative implications for postpartum care, including depression screening and initiation of contraception.

The pandemic is expected to have significant negative effects on mental health given the widespread stay-at-home orders, potential social isolation, stress over unemployment, fear of contracting or transmitting COVID-19, or grief over loss of loved ones.[2] In the perinatal context, the pandemic has been associated with an increased risk of postpartum depression and other mood disorders.[3] Postpartum depression affects up to 1 in 7 patients and is a leading cause of maternal morbidity and mortality.[4–7] Early recognition of postpartum depression through the use of validated screening tools is critical for initiating prompt treatment, but such tools may be used less frequently in a context with more remote care.[8] With the increased prevalence of postpartum depression during the pandemic, early recognition and treatment is ever more important for public health.

Furthermore, with the decline of in-person visits and shifts to telehealth methods during the pandemic, there has been an increase in the barriers to access the desired services such as access to long-acting reversible contraception (LARC).[9] LARCs are the most effective reversible method of contraception and are especially valuable in the pandemic setting because of their low failure rate and reduced need to return to the office or pharmacy for refills.[10,11] However, unless LARCs are placed during the delivery hospitalization, patients must attend an additional appointment for placement. Indeed, many in-person appointments for contraceptives have been delayed because these appointments are considered as nonessential.[9] Thus, limitations in in-person postpartum outpatient care caused by the pandemic could potentially lead to changes in LARC utilization.

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AJOG MFM at a Glance

Why was this study conducted?

The purpose of this study was to examine whether the COVID-19 pandemic was associated with changes to preventative postpartum healthcare services including postpartum depression screening and long-acting reversible contraceptive use.

Key findings

Compared with pregnant patients who delivered before the COVID-19 pandemic, those who delivered during the COVID-19 pandemic were significantly less likely to undergo postpartum depression screening and to receive long-acting reversible contraceptives within 3 months of delivery.

What does this add to what is known?

Healthcare system modifications during the COVID-19 pandemic may be responsible for a decrease in the rates of postpartum depression screening and changes in the use of postpartum contraceptives.

Understanding how the COVID-19 pandemic is associated with preventative health services in the postpartum period is vital to ensure targeted, effective, and patient-centered care. The objective of this study was to examine whether preventative health service utilization, including postpartum depression screening and contraception use, differed during the COVID-19 pandemic in comparison with the prepandemic period.

Materials and Methods

This retrospective cohort study included all pregnant patients who received prenatal care at 1 of 5 academic obstetrical practices and who delivered at the Northwestern Medicine Prentice Women's Hospital, Chicago, Illinois, either before or during the COVID-19 pandemic. The academic obstetrical practices include those staffed by obstetrician-gynecologist specialists, maternal-fetal medicine subspecialists, and certified nurse midwives. Obstetrical clinicians at these practices collectively perform approximately 3500 deliveries per year.

Pregnant patients were divided into the following 2 cohorts: those who delivered before the pandemic and those who delivered during the pandemic. Patients in the prepandemic cohort were included if they delivered between September 1, 2018, and January 1, 2019. This time period was chosen because it was when the postpartum depression screening rate reached a stable level of approximately 85% after institutional implementation of screening protocols. Patients in the pandemic cohort were included if they delivered between February 1, 2020, and May 15, 2020, because their 6-week postpartum visit was after the date when COVID-19 was declared a pandemic by the World Health Organization[12] and our health system began to offer patients the option to convert postpartum visits to telehealth consultations. This time period was chosen to fully capture our intended cohort, including those patients who delivered at the beginning of the pandemic.

Attendance of the postpartum visit (either in-person or via telehealth consultation) and completion of a postpartum depression screening was assessed by reviewing standardized fields within the electronic health record system. Performance of the Patient Health Questionnaire-9 (PHQ-9),[13] a validated self-reported measure of depressive symptomatology, is standard of care at every postpartum visit at our institution. For postpartum visits completed via telehealth during the pandemic, the PHQ-9 could be completed either over the phone or sent to patients via a secure web-based portal to complete and return. In some cases, patients returned their PHQ-9 screening via the web-based portal but did not attend a postpartum visit. Our electronic health record system allowed for PHQ-9 screening results to be entered into the relevant fields regardless of whether it was completed in-person or electronically, and thus we were able to use the results from all methods of screening in our analysis. All obstetrical practices included in these analyses utilized a single centralized electronic health record system for both inpatient and outpatient care.

The chosen method of contraception was ascertained by review of clinical documentation. Patients were classified as initiating LARC use if they received NEXPLANON (etonogestrel implant) or an intrauterine device either during the delivery hospitalization or within 3 months following delivery. Other contraception use was categorized according to provision of a prescription (eg, oral contraceptive pills) or by patient-reported intention of use (eg, condoms). For patients who initiated LARC use, the timing of placement was dichotomized by whether the LARC was placed during the delivery hospitalization or during an outpatient visit.

Electronic health records were reviewed for patients who met the inclusion criteria. The demographic and clinical data that were abstracted included maternal age, self-reported race or ethnicity, marital status, insurance status, body mass index at delivery, tobacco use, and any identified preexisting comorbidity (eg, prepregnancy diabetes, chronic hypertension, asthma). The obstetrical data that were abstracted included parity, pregnancy complications (eg, gestational diabetes and hypertensive disorders of pregnancy), gestational age at delivery, and route of delivery. Data on any positive SARS-CoV-2 test result obtained during pregnancy or delivery were also abstracted. Data were entered into the research electronic data capture system (REDCap; Vanderbilt University, Nashville, TN),[14] and missing or out of range data were re-reviewed.

Bivariable analyses were performed to examine whether delivery during the

COVID-19 pandemic was associated with a change in the rate of completion of postpartum depression screens or in the types of contraceptive methods used. Variables that were statistically significantly different in the bivariable analyses ($P<.05$) were considered for inclusion in the multivariable models as potential confounders. Multivariable logistic regressions were performed for the outcomes of postpartum depression screen completion and LARC utilization.

Two planned sensitivity analyses were done. The first sensitivity analysis excluded patients who did not attend a postpartum visit (either virtually or in-person), and the second excluded patients who tested positive for SARS-CoV-2 during pregnancy or delivery admission. Mann-Whitney U tests were used for the analysis of continuous variables, and chi-square tests were used for the analysis of categorical variables. Data were analyzed with Stata (version 15, StataCorp LLC, College Station, TX). This study was approved by the Northwestern University Institutional Review Board with a waiver of consent before its initiation.

Results

Of the 2375 pregnant patients included in this study, 1120 (47%) delivered during the COVID-19 pandemic. Compared with pregnant patients who delivered before the pandemic, those who delivered during the pandemic were less likely to attend a postpartum visit, either in-person or via telehealth consultation (87.7% vs 90.4%; $P=.036$). During the pandemic, 702 (71.6%) visits were completed by telehealth consultations and 278 (28.4%) were in-person.

The demographic and clinical characteristics of patients included in this study are displayed in Table 1. Compared with pregnant patients who delivered before the pandemic, those who delivered during the COVID-19 pandemic were less likely to be married or have diabetes (either preexisting or gestational) and more likely to have obesity or a hypertensive disorder of pregnancy. There were no differences in any other sociodemographic or clinical characteristics (Table 1).

TABLE 1
Baseline characteristics of pregnant patients stratified by delivery timing

Characteristics	Pre–COVID-19 n=1255	During COVID-19 n=1120	*P* value
Positive COVID-19 test result	0 (0.0)	7 (0.6)	—
Maternal age (y)	33.6 (30.7–36.4)	33.8 (30.7–36.4)	.80
Public insurance	164 (13.1)	167 (14.9)	.20
Race			.09
White	718 (57.2)	641 (57.2)	—
Black	148 (11.8)	169 (15.1)	—
Asian	120 (9.6)	87 (7.8)	—
Other	137 (10.9)	108 (9.6)	—
Unknown or declined to answer	132 (10.5)	115 (10.3)	—
Hispanic ethnicity	157 (13.6)	170 (16.5)	.06
Married	1009 (80.7)	864 (77.1)	.04
Ever used tobacco	159 (12.7)	147 (13.1)	.73
Any medical comorbidities[a]	479 (38.2)	429 (38.3)	.94
Preexisting diabetes	41 (3.3)	18 (1.6)	.01
Chronic hypertension	49 (3.9)	60 (5.4)	.09
BMI at delivery (kg/m^2)	29.2 (26.5–33.1)	29.8 (26.6–33.5)	.07
Presence of obesity at delivery	530 (42.6)	534 (47.7)	.01
Nulliparous	643 (51.2)	594 (53.0)	.38
Pregnancy complications			—
Gestational diabetes	78 (6.2)	49 (4.4)	.05
Hypertensive disorder of pregnancy	115 (9.2)	148 (13.2)	.002
Gestational age at delivery (wk)	39.3 (38.4–40.0)	39.1 (38.6–39.9)	.65
Preterm birth	129 (10.3)	101 (9.0)	.30
Cesarean delivery	287 (22.9)	275 (24.6)	.34
Attended postpartum visit	1134 (90.4)	982 (87.7)	.04

Data are presented as median (interquartile range) or number (percentage).

BMI, body mass index.

[a] Including preexisting diabetes, thyroid disease, epilepsy, kidney disease, pulmonary disease, heart disease, chronic hypertension, previous thrombosis, or autoimmune disease.

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Pregnant patients who delivered during the COVID-19 pandemic were significantly less likely to undergo postpartum depression screening (45.5% vs 86.2%; $P<.01$). This association persisted after controlling for potential confounders (Table 2). These outcomes persisted in sensitivity analyses that excluded patients who did not attend a postpartum visit (51.8% vs 95.4%; $P<.01$; adjusted odds ratio [aOR], 0.05; 95% confidence interval [CI], 0.04–0.07) and those who tested positive for SARS-CoV-2 during pregnancy or delivery admission (45.5% vs 86.2%; $P<.01$; aOR, 0.13; 95% CI, 0.10–0.16).

Distributions of contraceptive plans among pregnant patients who delivered before the pandemic and among those who delivered during the COVID-19 pandemic are shown in Table 3.

TABLE 2
Bivariable and multivariable analyses for the outcome of completion of postpartum depression screening

Covariates	OR	95% CI	aOR[a]	95% CI
Delivered during the COVID-19 pandemic	0.13	0.11–0.16	0.13	0.11–0.16
Married	1.82	1.48–2.23	1.82	1.44–2.29
Preexisting diabetes	0.89	0.52–1.52	0.62	0.74–1.11
BMI of >30 kg/m^2 at delivery	0.76	0.64–0.90	0.90	0.74–1.10
Gestational diabetes	0.89	0.61–1.30	0.70	0.46–1.07
Hypertensive disorder of pregnancy	0.69	0.52–0.89	0.86	0.64–1.16

aOR, adjusted odds ratio; *BMI*, body mass index; *CI*, confidence interval; *OR*, odds ratio.

[a] Covariates as shown in the table.

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Significant differences were identified in the distribution of the contraceptive method used (*P*=.004) and thus comparisons were made for individual contraceptive plans.

After controlling for confounders, pregnant patients who delivered during the COVID-19 pandemic were significantly less likely to use LARC methods within 3 months of delivery (aOR, 0.67; 95% CI, 0.53–0.84) (Table 4). These data also persisted in sensitivity analyses that excluded patients who did not attend a postpartum visit (15.1% vs 19.8%; *P*<.01; aOR, 0.67; 95% CI, 0.53–0.85) and those who tested positive for SARS-CoV-2 during pregnancy or delivery admission (13.3% vs 18.0%; *P*<.01; aOR, 0.67; 95% CI, 0.53–0.84). Of the patients who received a LARC method during the pandemic, 24% were placed during the delivery hospitalization, whereas 11% were placed during delivery hospitalization before the pandemic (*P*<.01).

TABLE 3
Contraception plan stratified by delivery timing

Contraception method	Pre–COVID-19 pandemic n=1133	During the COVID-19 pandemic n= 981	*P* value
Contraception plan			.004
None	144 (12.7)	147 (15.0)	.13
Condoms	380 (33.5)	333 (33.9)	.84
Depo-Provera	25 (2.2)	13 (1.3)	.13
LARC	222 (19.6)	132 (13.5)	<.001
COC or POP or patch or NuvaRing	297 (26.2)	293 (30.0)	.06
PPTL	34 (3.0)	32 (3.3)	.73
Other	31 (2.7)	31 (3.2)	.57

Data are presented as number (percentage).

COC, combined oral contraceptive; *LARC*, long-acting reversible contraceptive; *POP*, progesterone only pill; *PPTL*, postpartum tubal ligation.

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Discussion

Principal findings

These results demonstrate that the COVID-19 pandemic is associated with a decrease in the screening rates for postpartum depression and with changes in postpartum contraception utilization, with fewer patients opting for LARC methods. These outcomes may be a consequence of the changes in healthcare services implemented during the pandemic.

Results and clinical implications

Our findings underscore the degree to which the pandemic has impacted healthcare far beyond the implications immediately associated with viral-related illness. Reproductive healthcare has become a frequent topic of debate when it comes to defining essential services, oftentimes leading to restrictions on reproductive autonomy.[15] Given their increased need for both mental health and contraceptive care, pregnant and postpartum patients constitute a particularly vulnerable population, especially during the COVID-19 pandemic.

Increased rates of depression and anxiety symptoms in the general population and in a pregnant and postpartum population have been shown during the COVID-19 pandemic.[16–18] Before the onset of the COVID-19 pandemic, it was estimated that only 50% of pregnant and postpartum patients with depressive symptoms would be diagnosed.[19] Since the onset of the pandemic, the rates of both depression and anxiety during the perinatal period have more than doubled when compared with prepandemic rates.[19] This study was conducted in a state in which postpartum depression screening was legislatively mandated from 2008,[20] thus, we expect that this observed dip in screening rates during the COVID-19 pandemic is likely to be more pronounced in areas without mandated screening. Given the increased prevalence of perinatal mental health conditions during the pandemic, screening for postpartum depression becomes increasingly important to accurately identify patients who require treatment and to initiate appropriate treatment.

One potential reason for the observed decrease in postpartum depression screening during the pandemic could be

TABLE 4
Multivariable analyses for the outcome of LARC utilization

Covariates	OR	95% CI	aOR[a]	95% CI
Delivered during the COVID-19 pandemic	0.73	0.58–0.91	0.67	0.53–0.84
Married	0.78	0.60–1.01	0.81	0.62–1.06
Preexisting diabetes	1.41	0.74–2.68	1.16	0.60–2.25
Gestational diabetes	0.96	0.58–1.58	0.85	0.52–1.41
BMI of >30 kg/m^2 at delivery	1.24	0.99–1.55	1.17	0.92–1.46
Hypertensive disorder of pregnancy	1.40	1.01–1.94	1.37	0.98–1.91

aOR, adjusted odds ratio; *BMI*, body mass index; *CI*, confidence interval; *OR*, odds ratio.

[a] Covariates as shown in the table.

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the challenges associated with establishing a workflow to conduct validated screens during telehealth consultations. Although depression screening over the phone has been validated,[21] it may present logistical challenges including an increased amount of time spent per consultation. In addition, concerns have been documented for mental health assessments conducted over the telephone including the potential for patients to have difficulty with understanding the complex wording of questions, problems in remembering questions, and apprehension about verbally reporting sensitive information.[22–24] Development of a workflow that can facilitate the completion of electronic depression screenings in conjunction with a telehealth postpartum consultation is an important direction of future work.

The COVID-19 pandemic was also associated with fewer postpartum patients initiating LARC use. Although LARC methods are highly effective and reversible, placement requires an in-person encounter with a provider. Our results demonstrate that although the rates of LARC placement decreased overall during the pandemic, patients who received a LARC during the pandemic had a higher chance of having it placed during the delivery hospitalization than those who received a LARC before the pandemic. The American College of Obstetricians and Gynecologists recommends that immediate postpartum LARC placement should be offered to patients as a way of increasing access to contraception.[25] Immediate postpartum LARC placement may also benefit patients who are unable or unwilling to return for a postpartum visit, especially in the setting of a global pandemic when in-person visits are limited. However, because of challenges associated with insurance coverage and reimbursement, many hospitals around the United States do not offer this as an option for patients.[26] In addition, with changes in the cadence of prenatal visits, opportunities for antenatal education on contraceptive modalities may be more limited. During a global pandemic, increasing access to immediate postpartum LARC placement represents an opportunity to expand access to reliable contraception.

Strengths and limitations

An important strength of this study is the large and diverse population of patients who sought care at midwife-, perinatologist-, and obstetrician-based practices. However, this study is not without limitations. First, the time period of this study spans February 2020 to May 2020, the latter part of which was a period of rapid viral dissemination and stringent lockdown measures in Chicago and throughout the country. Thus, these results may not necessarily be transposable to later time periods during the pandemic, especially because healthcare organizations adjusted to the changes in healthcare delivery and re-expanded access to in-person visits. Second, the inclusion criteria for the pandemic cohort were selected to include patients who would have been scheduled for their postpartum visit during the COVID-19 pandemic. Although changes in healthcare behaviors as a function of the pandemic, including inpatient LARC utilization, would not be expected to occur before March 2020, our inclusion of these cases of LARC utilization could bias the results toward the null. Furthermore, this study was conducted at a single, quaternary care institution with protocols for health service responses to the pandemic catered specifically to the local pandemic epidemiology and care delivery context. Accordingly, our results may not be generalizable to other settings. Finally, our study is limited by the fact that we were unable to stratify our analyses by postpartum visits conducted in-person vs those conducted via telehealth consultation, which may provide useful information to better determine the impact of telehealth consultations on postpartum care provision.

Research implications

Future research should be conducted to examine the most effective platform to complete postpartum depression screening using electronic modalities for patients who are consulted via telehealth sessions. In addition, further research should investigate whether the pandemic affected access to mental healthcare for patients diagnosed with postpartum depression. If identified, implementation strategies to optimize access to postpartum mental healthcare in the context of the pandemic would be warranted. With respect to our finding on contraceptive utilization, additional studies are needed to determine if this observed decrease in LARC use among postpartum patients during the pandemic led to an increase in unintended pregnancies in the time period following the beginning of the COVID-19 pandemic. Support for methods that integrate contraceptive counseling during antenatal visits and availability of postpartum LARC placement may be strategies that can be used to maintain access to LARC for those who desire this modality of contraception. Finally, we recognize that postpartum depression screening and contraception use

are only 2 aspects of comprehensive postpartum care. Other critical components, including those related to health disparities and maternal morbidity and mortality, should be studied on a broader scale to further understand the effects of the COVID-19 pandemic.

Conclusions

Understanding how changes to postpartum care delivery can impact preventative healthcare service utilization, including postpartum depression screening and contraceptive utilization, can inform ongoing adaptations to healthcare delivery in the midst of the COVID-19 pandemic. Accordingly, these data can inform policies to maintain access to important postpartum services. ■

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Author and article information

From the Northwestern University Feinberg School of Medicine, Chicago, IL (Mses Sakowicz, Matovina, Imeroni, and Daiter); Department of Obstetrics and Gynecology, Northwestern University Feinberg School of Medicine, Chicago, IL (Dr Barry); Division of Maternal-Fetal Medicine, Department of Obstetrics and Gynecology, Northwestern University Feinberg School of Medicine, Chicago, IL (Drs Grobman and Miller).

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Corresponding author: Allie Sakowicz, MS. Allison.Sakowicz@northwestern.edu