Journal Pre-proof

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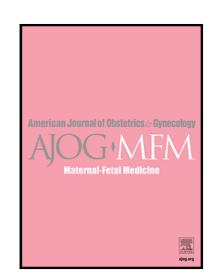Maya Daiter , Olivia Barry , William A. Grobman , Emily S. Miller

Please cite this article as: Allie Sakowicz , Chloe N. Matovina , Sidney K. Imeroni , Maya Daiter , Olivia Barry , William A. Grobman , Emily S. Miller , The association between the COVID-19 pandemic and postpartum care provision, *American Journal of Obstetrics & Gynecology MFM* (2021), doi: https://doi.org/10.1016/j.ajogmf.2021.100460

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

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Abstract Word Count: 308

Manuscript Word Count: 2546

Condensation: The COVID-19 pandemic was associated with a decrease in postpartum

depression screening rates and fewer patients receiving long-acting reversible contraception.

Short Title: COVID-19 pandemic and postpartum care provision

AJOG at a Glance:

A. The purpose of this study was to examine whether the COVID-19 pandemic was

associated with changes to postpartum preventative health services including postpartum

depression screening and long-acting reversible contraceptive use.

B. Compared to pregnant patients who delivered before the COVID-19 pandemic, those who

delivered during the COVID-19 pandemic were significantly less likely to have

postpartum depression screening performed and to receive long-acting reversible

contraceptive methods within three months of delivery.

C. Health systems modifications during the COVID-19 pandemic may be responsible for a

decrease in rates of screening for postpartum depression, as well as changes in

postpartum contraception utilization.

Keywords: postpartum depression, contraception, long-acting reversible contraception, LARC,

depression screening, COVID-19 pandemic, health services

2

Abstract

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

Objective: To examine whether preventative health service utilization, including postpartum depression screening and contraceptive utilization, differed during the COVID-19 pandemic as compared to a pre-pandemic period.

Study Design: This retrospective cohort study included all pregnant patients who underwent prenatal care within five academic obstetric practices and who delivered at Northwestern Memorial Hospital either before (delivery 9/1/2018-1/1/2019) or during (delivery 2/1/2020-5/15/2020) the COVID-19 pandemic. Completion of postpartum depression screening was assessed by reviewing standardized fields for documentation of this screening within the electronic health records. The method of contraception was ascertained from the postpartum clinical documentation. Patients were classified as initiating long-acting reversible contraception (LARC) if they received Nexplanon or an intrauterine device (IUD) during the delivery hospitalization or within three months following delivery. Bivariable and multivariable analyses were performed.

Results: Of 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 postpartum depression screening performed (45.5% vs 86.2%,

p<0.01); this association persisted after adjusting for potential confounders (aOR 0.13, 95% CI 0.11-0.16). Pregnant patients who delivered during the COVID-19 pandemic also were significantly less likely to initiate LARC methods within three months of delivery (13.5% vs 19.6%, aOR 0.67, 95% CI 0.53-0.84).

Conclusion: The onset of the COVID-19 pandemic is associated with decreases in the completion of postpartum depression screening and fewer overall patients receiving LARC methods for contraception. These data can inform adaptations in healthcare delivery in the midst of the ongoing COVID-19 pandemic.

4

Introduction

The Coronavirus disease 2019 (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 in order to minimize the risk of COVID-19 transmission to healthy patients and healthcare workers. Such changes in the obstetric setting include paring down frequency of antenatal visits and shifting visits to telehealth, including for postpartum care. While this approach is necessary to limit viral spread, these health systems 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 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 one in seven patients and is a leading cause of maternal morbidity and mortality.[4,5,6,7] Early recognition of postpartum depression through the use of validated screening tools is critical in order to initiate 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.

Further, with the decline of in-person visits and shift to telehealth delivery during the pandemic, there have been increased barriers to accessing desired services such as long-acting reversible contraception (LARC).[9] LARCs are the most effective reversible method of contraception and are especially valuable in the pandemic setting due to their low failure rate and reduced need to return

5

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 contraception have been delayed as a result of not being considered essential.[12] Thus, limitations to in-person postpartum outpatient care caused by the pandemic could potentially lead to changes in LARC utilization.

Understanding how the COVID-19 pandemic is associated with preventive health services in the postpartum period is vital in order 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 contraceptive utilization, differed during the COVID-19 pandemic as compared to a pre-pandemic period.

Methods

This retrospective cohort study included all pregnant patients who received prenatal care with one of five academic obstetric practices and delivered at Northwestern Memorial Hospital's Prentice Women's Hospital 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. Obstetric clinicians at these practices collectively perform approximately 3,500 deliveries per year.

Pregnant patients were divided into two cohorts: those who delivered prior to the pandemic and those who delivered during the pandemic. Patients in the pre-pandemic cohort were included if they delivered between September 1, 2018 and January 1, 2019. This time period was chosen because it is 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, as

their six-week postpartum visits fell after the date when SARS-CoV-2 was declared a pandemic by the World Health Organization[13] and our health system began to offer patients the option to convert postpartum visits to telehealth. This time period was chosen in order to fully capture our intended cohort, including those patients that delivered at the beginning of the pandemic.

Attendance at the postpartum visit (either in-person or by telehealth), as well as completion of postpartum depression screening, was assessed by reviewing standardized fields within the electronic health record. Performance of the Patient Health Questionnaire-9 (PHQ-9)[14], 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 allowed for PHQ-9 screening results to be entered into the relevant field regardless of whether it was completed in-person or electronically, and thus we were able to use results from all methods of screening in our analysis. All obstetric practices included in these analyses utilized a single centralized electronic health record for both inpatient and outpatient care.

The chosen method of contraception was ascertained by reviewing the clinical documentation. Patients were classified as initiating LARC if they received Nexplanon or an IUD either during the delivery hospitalization or within three months following delivery. Other contraceptive utilization was categorized according to either the prescription provided (e.g., oral contraceptive pills) or by patient-reported intention of use (e.g., condoms). For patients who initiated LARC, the timing of placement was dichotomized by whether the LARC was placed during the delivery hospitalization or during an outpatient visit.

7

Electronic health records were reviewed for all patients meeting inclusion criteria. Demographic and clinical data included maternal age, self-reported race or ethnicity, marital status, insurance status, body mass index (BMI) at delivery, tobacco use, and any identified pre-existing co-morbidity (e.g., pre-pregnancy diabetes, chronic hypertension, asthma). Obstetrical data included parity, pregnancy complications (e.g., gestational diabetes and hypertensive disorders of pregnancy), gestational age at delivery, and route of delivery. Data on any positive SARS-CoV-2 test during pregnancy or at delivery were also abstracted. Data were entered into the research electronic data capture system (REDCap; Vanderbilt University)[15], 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 postpartum depression screen completion or types of contraception utilization. Variables that were statistically significantly different in bivariable analyses ($p<0.05$) were considered for inclusion in 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 at delivery. Mann-Whitney U tests were used for continuous variables, and chi-square tests were used for 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 prior to its initiation.

Results

8

Of the 2375 pregnant patients included in this study, 1120 (47%) delivered during the COVID-19 pandemic. Compared to 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 (87.7% vs 90.4%, p=0.036). During the pandemic, 702 (71.6%) visits were conducted by telehealth and 278 (28.4%) were in-person.

Demographic and clinical characteristics of patients included in this study are displayed in Table 1. Compared to 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 pre-existing or gestational) and more likely to be obese or have a hypertensive disorder of pregnancy. There were no differences in any other sociodemographic or clinical characteristics (Table 1).

Pregnant patients who delivered during the COVID-19 pandemic were significantly less likely to have postpartum depression screening (45.5% vs 86.2%, p<0.01) performed. This association persisted after controlling for potential confounders (Table 2). These data persisted in sensitivity analyses excluding patients who did not attend a postpartum visit (51.8% vs 95.4%, p<0.01, aOR 0.05, 95% CI 0.04-0.07) and excluding patients who tested positive for SARS-CoV-2 during pregnancy or at delivery (45.5% vs 86.2%, p<0.01, aOR 0.13, 95% CI 0.10-0.16).

Distributions of contraceptive plans comparing pregnant patients who delivered before versus during the COVID-19 pandemic are shown in Table 3. Significant differences were identified in the distribution of contraception utilized (p=0.004) and so comparisons were made in each individual contraceptive plan.

After controlling for confounders, pregnant patients who delivered during the COVID-19 pandemic were significantly less likely to use LARC methods within three months of delivery (aOR 0.67, 95% CI 0.53-0.84) (Table 4). These data also persisted in sensitivity analyses

9

excluding patients who did not attend a postpartum visit (15.1% vs 19.8%, p<0.01, aOR 0.67, 95% CI 0.53-0.85) and excluding patients who tested positive for SARS-CoV-2 during pregnancy or at delivery (13.3% vs 18.0%, p<0.01, 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, as compared to 11% prior to the pandemic (p<0.01).

Discussion

Principal Findings

These results demonstrate that the COVID-19 pandemic was associated with a decrease in screening for postpartum depression, as well as changes in postpartum contraception utilization, with fewer patients receiving LARC methods. These findings may have occurred as a result of health services changes during the pandemic.

Results and clinical implications

Our findings underscore the degree to which the pandemic has health implications far beyond those immediately related to viral-related illness. Reproductive healthcare has become a frequent topic of debate when it comes to defining services as essential, oftentimes leading to restrictions on reproductive autonomy.[16] Given their increased need for both mental health and contraceptive care, pregnant and postpartum patients represent a particularly vulnerable population during the COVID-19 pandemic.

The COVID-19 pandemic has been shown to increase rates of symptoms of depression and anxiety both in the general population and in a pregnant and postpartum population.[17,18,19] Prior to the onset of the COVID-19 pandemic, it was estimated that only 50% of pregnant and postpartum patients with depressive symptoms would be diagnosed.[20] Since the onset of the pandemic, rates

10

of both depression and anxiety during the perinatal period have more than doubled compared to pre-pandemic values.[20] This study was conducted in a state which legislatively mandated postpartum depression screening in 2008[21], thus we would 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 in order to accurately identify patients and initiate appropriate treatment.

One potential reason for the observed decrease in postpartum depression screening during the pandemic could be the challenge of establishing a workflow to administer validated screening tools during telehealth visits. While depression screening over the phone has been validated[22], it may present logistical challenges including an increased amount of time spent per visit. In addition, concerns have been documented for mental health assessments administered over the telephone including the potential for patients to have difficulty understanding complex wording of questions, problems in remembering questions, and apprehension about verbally reporting sensitive information.[23,24,25] Development of a workflow to facilitate electronic completion of depression screening in conjunction with a telehealth postpartum appointment is an important direction of future work.

The COVID-19 pandemic was also associated with fewer patients initiating LARC for postpartum contraception. While LARC methods are highly effective and reversible, placement requires an in-person encounter with a provider. Our results demonstrate that while rates of LARC placement decreased overall during the pandemic, patients who did receive a LARC during the pandemic had a higher chance of having it placed during the delivery hospitalization as compared to before the pandemic. The American College of Obstetricians and Gynecologists recommends that immediate postpartum LARC placement be offered to patients as a way to

11

increase access to contraception.[26] 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, as a result of challenges with insurance coverage and reimbursement, many hospitals around the United States do not offer this as an option for patients.[27] 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 midwifery-, perinatologist-, and obstetrician-based practices. However, this study is not without limitations. First, the time period of this study spans February 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 data may not necessarily be transposable to later time periods during the pandemic, especially as healthcare organizations adjusted to 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. Though changes in healthcare behaviors as a result of the pandemic, including inpatient LARC utilization, would not have been expected to occur prior to March 2020, our inclusion of these cases of LARC utilization would bias toward the null. Next, this study was conducted at a single quaternary care institution, with protocols for health services responses to the pandemic catered 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

12

conducted in-person versus via telehealth, which may be useful information to better determine the impact of telehealth on postpartum care provision.

Research implications

Future research should be conducted to examine the most effective platform to complete screening for postpartum depression using electronic modalities for patients seeing providers via telehealth in order to optimize completion of postpartum depression screening. In addition, further research should address whether the pandemic affected access to mental healthcare for patients diagnosed with postpartum depression. If identified, implementation strategies to optimize access to postpartum mental health care 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 patients utilizing LARC methods of contraception during the pandemic led to an increase in unintended pregnancies in the time period following the beginning of the COVID-19 pandemic. Support on methods to integrate contraceptive counseling during antenatal visits, as well as availability of postpartum LARC, may be strategies to maintain access to LARC for those who desire this modality of contraception. Finally, we recognize that postpartum depression screening and contraception are only two 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 in order to further understand the effects of the COVID-19 pandemic.

Conclusions

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

13

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14

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15

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16

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17

Table 1: Baseline characteristics of pregnant patients stratified by delivery timing

	Pre-COVID n=1255	During COVID n= 1120	p value
Positive COVID-19 test	0 (0.0%)	7 (0.6%)	-
Maternal age (years)	33.6 (30.7-36.4)	33.8 (30.7-36.4)	0.80
Public insurance	164 (13.1%)	167 (14.9%)	0.20
Race			0.09
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/declined	132 (10.5%)	115 (10.3%)	
Hispanic ethnicity	157 (13.6%)	170 (16.5%)	0.06
Married	1009 (80.7%)	864 (77.1%)	0.04
Ever used tobacco	159 (12.7%)	147 (13.1%)	0.73
Any medical co-morbidities*	479 (38.2%)	429 (38.3%)	0.94
Pre-existing diabetes	41 (3.3%)	18 (1.6%)	0.01
Chronic hypertension	49 (3.9%)	60 (5.4%)	0.09
BMI at delivery (kg/m^2)	29.2 (26.5-33.1)	29.8 (26.6-33.5)	0.07
Obese at delivery	530 (42.6%)	534 (47.7%)	0.01
Nulliparous	643 (51.2%)	594 (53.0%)	0.38
Pregnancy complications			
Gestational diabetes	78 (6.2%)	49 (4.4%)	0.05
Hypertensive disorder of pregnancy	115 (9.2%)	148 (13.2%)	0.002
Gestational age at delivery (weeks)	39.3 (38.4-40.0)	39.1 (38.6-39.9)	0.65
Preterm birth	129 (10.3%)	101 (9.0%)	0.30
Cesarean delivery	287 (22.9%)	275 (24.6%)	0.34
Attended postpartum visit	1134 (90.4%)	982 (87.7%)	0.04

Data presented as median (interquartile range) or n (%)
*Including pre-existing diabetes, thyroid disease, epilepsy, kidney disease, pulmonary disease, heart disease, chronic hypertension, prior thrombosis or autoimmune disease

18

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

	OR	95% CI	aOR*	95% CI
Delivered during 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
Pre-existing diabetes	0.89	0.52-1.52	0.62	0.74-1.11
BMI > 30kg/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

OR = odds ratio; aOR = adjusted odds ratio; CI = confidence interval; BMI = body mass index
*Covariates as shown in table

19

Table 3: Contraception plan stratified by delivery timing

	Pre-COVID-19 pandemic n=1133	During COVID-19 pandemic n= 981	p value
Contraception plan decided upon			0.004
None	144 (12.7%)	147 (15.0%)	0.13
Condoms	380 (33.5%)	333 (33.9%)	0.84
Depo-Provera	25 (2.2%)	13 (1.3%)	0.13
LARC	222 (19.6%)	132 (13.5%)	<0.001
COC/POP/Patch/Nuvaring	297 (26.2%)	293 (30.0%)	0.06
PPTL	34 (3.0%)	32 (3.3%)	0.73
Other	31 (2.7%)	31 (3.2%)	0.57

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

Data presented as median (interquartile range) or n (%)

20

Table 4: Multivariable analyses for the outcome of LARC utilization

	OR	95% CI	aOR*	95% CI
Delivered during 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
Pre-existing 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 > 30kg/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

OR = odds ratio; aOR = adjusted odds ratio; CI = confidence interval; BMI = body mass index
*Covariates as shown in table