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Short communication

Impact of the COVID-19 pandemic on mental health, access to care, and health disparities in the perinatal period

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ABSTRACT

Background: The COVID-19 pandemic has affected mental health and created barriers to healthcare. In this study, we sought to elucidate the pandemic's effects on mental health and access to care for perinatal individuals.
Methods: This cross-sectional study of individuals in Massachusetts who were pregnant or up to three months postpartum with a history of depressive symptoms examined associations between demographics and psychiatric symptoms (via validated mental health screening instruments) and the COVID-19 pandemic's effects on mental health and access to care. Chi-square associations and multivariate regression models were used.
Results: Of 163 participants, 80.8% perceived increased symptoms of depression and 88.8% of anxiety due to the pandemic. Positive screens for depression, anxiety, and/or PTSD at time of interview, higher education, and income were associated with increased symptoms of depression and anxiety due to the pandemic. Positive screens for depression, anxiety, and/or PTSD were also associated with perceived changes in access to mental healthcare. Compared to non-Hispanic White participants, participants of color (Black, Asian, Multiracial, and/or Hispanic/Latinx) were more likely to report that the pandemic changed their mental healthcare access (aOR:3.25, 95%CI:1.23, 8.59).
Limitations: Limitations included study generalizability, given that participants have a history of depressive symptoms, and cross-sectional design.
Conclusions: The pandemic has increased symptoms of perinatal depression and anxiety and impacted perceived access to care. Self-reported increases in depression and anxiety and changes to healthcare access varied by education, race/ethnicity, income, and positive screens. Understanding these differences is important to address perinatal mental health and provide equitable care.

1. Introduction

Perinatal mood and anxiety disorders, affecting one in five individuals, are common (Kendig et al., 2017) and a leading, preventable cause of pregnancy-related death (Davis et al., 2019). Detection, diagnosis, and treatment are critical to help mitigate health consequences (Meltzer-Brody and Stuebe, 2014).

Emerging data suggest that the COVID-19 pandemic (referred to as "the pandemic" henceforth) has increased depression and anxiety in the general population (Czeisler et al., 2020) and amongst individuals in the perinatal period (Wu et al., 2020). There is limited research examining which factors may be exacerbating these problems. People of color (defined as Black, Asian, Multiracial, and/or Hispanic/Latinx) are at higher risk for adverse mental health outcomes and disruptions in healthcare access (McGuire and Miranda, 2008). Pandemic-related hospitalizations and deaths are also affecting people of color more, indicating that the pandemic is widening health disparities (Knittel and Ozaltun, 2020; Price-Haywood et al., 2020). We aimed to identify factors associated with increases in symptoms of perinatal depression and anxiety and disparities in healthcare access during the pandemic.

2. Materials and methods

We examined a cross-sectional subset of individuals recruited within

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an ongoing randomized control trial (RCT) designed to integrate obstetric and mental healthcare, as described elsewhere (Clinical Trials #NCT02760004) (Moore Simas et al., 2019). The RCT includes English-speaking participants in Massachusetts that screened positive for depression (Edinburgh Postnatal Depression Scale [EPDS]) (Cox et al., 1987) at initial interview (conducted 10/2015-present), while pregnant, or up to 3-months postpartum. Validated screening tools are administered and repeated with each interview, including: (1) EPDS (positive screen: [EPDS]≥10), (2) Generalized Anxiety Disorder 7-item scale (GAD-7) for anxiety (positive: GAD-7≥8) (Spitzer et al., 2006), (3) Post-traumatic stress disorder (PTSD) Checklist-Civilian Version (PCL-C) (scored using Diagnostic and Statistical Manual of Mental Disorders symptom cluster scoring) for PTSD (Weathers et al., 1994); and (4) Barriers to Access to Care Evaluation (BACE) instrumental subscale, which measures non-stigma related barriers to care (e.g., transportation problems to appointments) (Clement et al., 2012). Higher scores on the BACE indicate more barriers. Validated screening thresholds for the EPDS range from 9 to 13; however, score cut-offs in the 9–10 range are often used in non-psychiatric or primary care settings, to lower the rates of false negatives (ACOG, 2018; Cox et al., 1987; Earls et al., 2019).

This sub-study included participants that completed at least one interview with the aforementioned sub-scales and pandemic-related questions from March 23 to September 14, 2020 (n = 163, approximately half of total RCT participants). We examined how demographics and positive screens were associated with the pandemic's perceived effects.

Outcomes of the sub-study included perceived pandemic-related increases in symptoms of depression ("To what extent has coronavirus increased your feelings of depression?") and anxiety ("To what extent has coronavirus made you feel more anxious?") and changes in access to care (e.g., "To what extent has coronavirus affected your ability to get the healthcare you need for yourself?"). These were measured using a 5-point Likert-style scale (not at all/slightly/somewhat/moderately/to a great degree; Supplemental Table 1).

Differences in outcomes were assessed across demographics, screening scores, and BACE scores using chi-square and t-tests; for association tests only, outcomes were dichotomized ("not at all" versus all other options).

Uni- and multivariate logistic models examined the association of demographics and positive screens with increases in symptoms of depression and anxiety and access to care. To accommodate expected underlying distributions, ordinal logistic regressions were used. For final model parsimony, variables identified *a priori* as possible confounders and independent variables without evidence of collinearity were included (i.e., age, race/ethnicity, income, and positive screeners).

We conducted sensitivity analyses that defined outcomes two different ways: 1) using a different cut-point ("minor impact" [not at all, slightly, somewhat] vs. "major impact" [moderately, to a great degree]), and 2) treating outcomes as continuous variables (rather than categorical) and using linear regressions. Analyses were conducted using Stata-14.2.

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. All procedures were approved by University of Massachusetts Medical School Institutional Review Board (#H00009163). Verbal informed consent was obtained from all participants.

3. Results

At the time of sub-study interview, 50.9% screened positive for depression, 41.1% for anxiety, and 19.0% for PTSD (Supplemental Table 2). Most participants (80.5%) reported that their obstetric practices changed the way they provided prenatal care during the pandemic.

Most participants reported that the pandemic affected their life in many ways (Supplemental 2). Eighty percent of participants perceived increased symptoms of depression (80.4%) and 88.8% perceived increased symptoms of anxiety, and 58.4% reported that their ability to access healthcare for themselves was affected. Higher BACE scores, indicating greater barriers to care, were positively correlated with all access to care measures (Supplemental Table 3a).

Positive depression, anxiety, and PTSD screens, having a bachelor's degree or higher degree, and higher income were associated with increased symptoms of depression and anxiety due to the pandemic (Table 1). Positive depression, anxiety, and PTSD screens were all associated with perceived changes in accessing mental healthcare. BACE scores were higher in participants who reported any perceived changes in access to healthcare or mental healthcare (Supplemental 3a).

After adjusting for age, race/ethnicity, and positive screens (Table 2), higher income was associated with experiencing higher depression due to the pandemic (aOR: 2.33; 95%CI: 1.19, 4.57). After adjusting for age, income and positive screens, participants of color were more likely to report that the pandemic affected their ability to access mental healthcare, compared to non-Hispanic White participants (aOR: 3.25, 95%CI: 1.23, 8.59). In participants who noted any perceived change in their access to general, obstetric, or mental healthcare, BACE scores were significantly higher amongst participants of color (Supplemental 3b).

Sensitivity analyses yielded similar results (Supplemental Tables 4–6); when the outcomes were analyzed using the categorical cut-point that was set to "major" vs. "minor impact" and when analyzed evaluating the outcomes as continuous (e.g., correlations and linear regressions), trends were similar.

4. Discussion

In this sample of individuals in the perinatal period with a history of depression symptoms, the majority reported that the COVID-19 pandemic increased their symptoms of depression and anxiety. At time of sub-study participation during the pandemic, half screened positive for depression, two-fifths for anxiety, and one in five for PTSD.

Many factors, including race/ethnicity, income, and positive screens, were associated with perceived effects of the pandemic on depression, anxiety, and access to care. Participants with positive screens for depression and anxiety reported that the pandemic has affected all examined domains. Participants of color reported substantial changes in their ability to access mental healthcare, beyond those reported by non-Hispanic White participants. This is aligned with the emerging data on the pandemic that highlights the increased risk that women of color face, from contracting the disease to access to testing to health outcomes (Alcendor, 2020; Lieberman-Cribbin et al., 2020; Millett et al., 2020; Williams and Cooper, 2020). Our results further demonstrate that adaptations in mental healthcare in response to the pandemic need to reflect the needs of various demographic groups and, especially, to bridge care gaps for people of color. Future studies are needed to uncover the extent to which public health crises may intersect with and exacerbate disparities in mental healthcare (e.g., differential access, geographic proximity).

Our data also suggest that health systems and obstetric practices are changing in response to the pandemic. As healthcare systems continue to adapt in the context of the pandemic, it is important to evaluate the impact of these changes on equitable access and quality of care delivery.

Illuminating health disparities that are worsened by crises can help inform and promote equity- and inclusion-based initiatives. It is important that we continue to adapt existing resources that can help providers identify and treat individuals with maternal mental health conditions (Byatt et al., 2019).

4.1. Limitations

The generalizability of our results is limited by the sample size and

Table 1
Impact of COVID-19 pandemic on access to care and mental health by participant sociodemographic and clinical characteristics.[a] Participants are individuals in the perinatal period, who previously screened positive on Edinburgh Postnatal Depression Scale (EPDS; positive screen defined as ≥10) and participated in an ongoing randomized control trial (RCT) in Massachusetts – the PRogram In Support of Moms (PRISM, conducted 10/2015-present). This sub-study examined participants with at least one interview between March and September 2020.

	Has the pandemic increased your depression?		Has the pandemic increased your anxiety?		Has the pandemic affected your ability to get healthcare?		Has the pandemic affected your ability to get mental healthcare?	
	Not at all (%)	*Any effect (%)*	*Not at all (%)*	*Any effect (%)*	Not at all (%)	*Any effect (%)*	*Not at all (%)*	*Any effect (%)*
All participants (n = 163)	19.3	80.8	11.3	88.8	41.6	58.4	64.1	35.9
>35 years (n = 45)	13.3	86.7	9.1	90.9	37.8	62.2	66.7	33.3
< 35 years (n = 118)	21.6	78.5	12.1	87.9	43.1	56.9	63.0	37.0
College education (n = 72)	11.3*	88.7*	2.8**	97.2**	40.9	59.2	69.8	30.2
Less than college education (n = 91)	25.6*	74.4*	18.0**	82.0**	42.2	57.8	59.4	40.6
Participants of color[b] *(n=80)*	24.1	76.0	15.4	84.6	43.0	57.0	57.1	42.9
Non-Hispanic White participants (n = 79)	15.4	84.6	7.7	92.3	42.3	57.7	72.4	27.6
Public insurance (n = 74)	28.8**	71.2**	15.3	84.7	43.8	56.2	66.0	34.0
Private insurance (n = 88)	11.5**	88.5**	6.9	93.1	40.2	59.8	63.5	36.5
Married/Partnered (n = 108)	16.0	84.0	5.7**	94.3**	43.4	56.6	63.0	37.0
Unmarried/No partner (n = 55)	25.5	74.6	22.2**	77.8**	38.2	61.8	65.9	34.1
Income <$60,000 (n = 79)	29.5**	70.5**	18.2*	81.8*	41.0	59.0	67.3	32.7
Income ≥$60,000 (n = 68)	7.5**	92.5**	4.5*	95.5*	40.3	59.7	66.7	33.3
Positive EPDS[c] *(n = 82)*	7.5***	92.5***	1.3***	98.8***	35.0	65.0	53.3*	46.7*
Negative EPDS[c] *(n = 79)*	31.7***	68.4***	21.8***	78.2***	48.1	51.9	75.4*	24.6*
Positive GAD-7[d] *(n = 67)*	6.2**	93.9**	3.1**	96.9**	27.7**	72.3**	50.0**	50.0**
Negative GAD-7[d] *(n = 96)*	28.1**	71.9**	16.7**	83.3**	51.0**	49.0**	75.4**	24.6**
Positive PCL-C[e] *(n = 31)*	0.0**	100.0**	0.0*	100.0*	33.3	66.7	43.5*	56.5*
Negative PCL-C[e] *(n = 132)*	23.7**	76.3**	13.7*	86.3*	43.5	56.5	69.2*	30.9*

[a] Chi-square analyses were conducted within each characteristic (each like-shaded row). Characteristics and Likert-style responses were collapsed for analysis: "Not at all" versus "Any effect" (i.e., Slightly, Somewhat, Moderately, and To a great degree). Percentages may not add up to 100% due to rounding. Bolded values indicate significance in a Chi-square test.

[*] $p < 0.05$ **$p < 0.01$ ***$p < 0.001$.

[b] Categories of race are not mutually exclusive. Multiracial: participant who identified with more than one race.

[c] EPDS = Edinburgh Postnatal Depression Scale; positive screen defined as an EPDS≥10. EPDS scores reported in table were those from the participant's first interview conducted at the time of the pandemic (initial or follow-up). Though all participants scored EPDS≥10 at initial interview, EPDS was not necessarily positive in follow-up interviews.

[d] GAD-7 = Generalized Anxiety Disorder 7-item scale; positive screen defined as GAD-7≥8.

[e] PCL-C = Post-traumatic stress disorder Checklist-Civilian version; scored using Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) symptom cluster scoring.

study population – participants enrolled in the parent study after a positive depression screen. Additionally, the study's cross-sectional design and nature of outcomes measured pandemic-related changes without explicitly determining directionality. However, participants who reported pandemic-related changes in access to care, including participants of color, had higher BACE scores, and pandemic-related access to care measures were positively correlated with higher BACE scores. Together, these data suggest that pandemic-related changes in access to care are deleterious, though additional exploration is required.

5. Conclusions

The COVID-19 pandemic is associated with increased symptoms of depression and anxiety and perceived changes in access to mental healthcare among individuals in the perinatal period with a history of depression. The degree to which the pandemic impacted these participants varied by race/ethnicity, income, and positive screens – most notably, participants of color were more impacted. It is important that providers and systems are aware of the widened health and mental health disparities during this time and take action to ensure equitable mental healthcare for all.

Author contributions

The authors all had full access to the data and participated in formulating the research questions. GAM conducted all of the data analysis with guidance from SDP; analyses were checked by EA and ALB. All co-authors contributed to the manuscript composition. GAM and NB had final responsibility for the decision to submit.

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The findings and conclusions in this manuscript are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Declaration of competing interest

TMS is a consultant as the Engagement Director for Massachusetts Child Psychiatry Access Program (MCPAP) for Moms and as such has received a stipend from the Massachusetts Department of Mental Health via Beacon Health Options. TMS has served on ad hoc advisory boards and as a speaker for Sage Therapeutics, was a consultant for Sage Therapeutics and Ovia, and has received honoraria from Miller Medical Communications. TMS is the co-chair of the American College of Obstetricians and Gynecologists' Maternal Mental Health Expert Work Group. NB is the statewide Medical Director of the MCPAP for Moms and thus has received salary and/or funding support from Massachusetts Department of Mental Health. NB has served on ad hoc advisory boards

Table 2
Unadjusted and adjusted associations of participant characteristics and perceived impact of the COVID-19 pandemic on mental health and access to care. Participants are individuals in the perinatal period, who previously screened positive on Edinburgh Postnatal Depression Scale (EPDS; positive screen defined as ≥10) and participated in an ongoing randomized control trial (RCT) in Massachusetts – the PRogram In Support of Moms (PRISM, conducted 10/2015-present). This sub-study examined participants with at least one interview between March and September 2020.

	Increased depression?				Increased anxiety?				Ability to get healthcare?				Ability to get mental healthcare?			
	OR[a]	95% CI[b]	aOR[c]	95% CI[b]	OR[a]	95% CI[b]	aOR[c]	95% CI[b]	OR[a]	95% CI[b]	aOR[c]	95% CI[b]	OR[a]	95% CI[b]	aOR[c]	95% CI[b]
35 and up (n = 45) (ref: under 35, n=118)	1.26	0.69–2.30	1.23	0.63–2.39	1.05	0.56–1.98	0.93	0.47–1.83	1.39	0.74–2.61	1.32	0.65–2.66	0.95	0.42–2.13	1.63	0.63–4.21
Participants of color (n = 80) (ref: Non-Hispanic White, n=79)	0.63	0.36–1.10	0.55	0.28–1.06	0.68	0.38–1.19	0.58	0.30–1.11	0.97	0.55–1.71	0.78	0.40–1.52	2.03	0.95–4.34	3.25*	1.23–8.59
Income ≥60k (n=68) (ref < 60, n=79)	2.31**	1.28–4.17	2.33*	1.19–4.57	1.96*	1.08–3.56	1.75	0.91–3.37	1.00	0.55–1.80	0.82	0.42–1.61	0.96	0.44–2.12	1.32	0.49–3.52
Positive EPDS[d] (n=82) (ref = negative EPDS, n=79)	3.91***	2.18–7.03	1.81	0.90–3.62	2.65**	1.49–4.71	1.62	0.80–3.27	1.96*	1.11–3.48	1.56	0.77–3.16	2.96**	1.37–6.39	3.25*	1.15–9.17
Positive GAD[e] (n=67) (ref = negative GAD, n=96)	2.77***	1.56–4.90	1.96	0.96–4.02	2.60**	1.45–4.66	2.13*	1.01–4.49	2.66**	1.49–4.76	2.14*	1.01–4.54	3.02**	1.41–6.47	1.94	0.68–5.54
Positive PCL[f] (n=31) (ref = negative PCL, n=132)	3.69***	1.81–7.51	2.79*	1.09–7.13	2.34*	1.14–4.80	1.12	0.43–2.90	1.61	0.79–3.27	1.25	0.50–3.12	2.19	0.95–5.10	1.15	0.35–3.84

[a] OR = odds ratio from ordinal logistic regression model; bolded values indicate significance in logistic regression: *p < 0.05 **p < 0.01 ***p < 0.001.

[b] 95% CI = 95% confidence interval.

[c] aOR = adjusted odds ratio from ordinal logistic model. aOR is adjusted for age, race/ethnicity, income, and positive screeners.Bolded values indicate significance in logistic regression: *p < 0.05 **p < 0.01 ***p < 0.001.

[d] EPDS = Edinburgh Postnatal Depression Scale; positive screen defined as an EPDS≥10. EPDS scores reported in table were those from the participant's first interview conducted at the time of the pandemic (initial or follow-up). Though all participants scored EPDS≥10 at initial interview, EPDS was not necessarily positive in follow-up interviews.

[e] GAD-7 = Generalized Anxiety Disorder 7-item scale; positive screen defined as GAD-7≥8.

[f] PCL-C = Post-traumatic stress disorder Checklist-Civilian version; scored using Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) symptom cluster scoring.

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Appendix A. Supplementary data

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