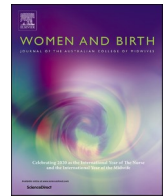




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Original Research

The impact of perinatal healthcare changes on birth trauma during COVID-19

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ABSTRACT

Background: Since the onset of COVID-19, giving birth has involved navigating unprecedented healthcare changes that could significantly impact the psychological birth experience.

Aim: Research has demonstrated increasing rates of birth trauma and birth plan alterations during the COVID-19 pandemic. This study specifically examined these intersecting experiences to understand how COVID-related healthcare changes have impacted birth trauma during the pandemic.

Methods: 269 people who gave birth in the U.S. during COVID-19 completed an online survey between November, 2020-May, 2021 which included questions about COVID-related perinatal healthcare changes and birth-related posttraumatic stress disorder (PTSD; The City Birth Trauma Scale). T-tests were run on birth demographics to assess for significant indicators of PTSD; variables having significant effects were used to build a hierarchical regression model to predict PTSD symptoms.

Findings: 5.9% of the sample met criteria for PTSD and 72.3% met partial criteria. The overall regression model predicted approximately 19% of variance in total PTSD symptoms. Labor and birth demographics were entered in Step 1 and predicted approximately 11% of variance: limited length of stay for support person, being allowed 1 support person who had to be the same, and mask requirements were significant predictors of PTSD. Variables related to birth plan changes were entered in Step 2 and predicted approximately 8% of variance: changes to support person(s) for labor and birth, breastfeeding plans, and birth location were significant predictors of PTSD.

Conclusion: The present study demonstrates the importance of COVID-related perinatal healthcare changes to the development of trauma symptoms following childbirth.

Statement of Significance

Problem

COVID-19 has increased rates of psychological distress and psychiatric symptoms in pregnant and postpartum women.

What is already known

While previous studies have examined the increased rates of trauma symptoms during COVID-19 and others have examined birth plan alterations due to policy changes from COVID-19, we do not yet know how birthing individual's experiences of swift and significant healthcare policy changes during the COVID-19 pandemic have impacted traumatic births.

What this paper adds

Evidence that specific COVID-related perinatal healthcare changes, such as visitor restrictions and mask mandates, impacted the development of trauma symptoms following childbirth.

Changes to birth plans during the pandemic, including changes to one's support person(s) for labor and birth, breastfeeding plans, and location for birth, also had significant impacts on developing trauma symptoms following childbirth.

Recommendations for healthcare providers to provide trauma-informed care in light of pandemic restrictions.

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1. Introduction

1.1. Birth trauma & posttraumatic stress disorder (PTSD)

Birth trauma is defined as “an event occurring during the labor and [birth] process that involves actual or threatened serious injury or death to the mother or her infant. The birthing woman experiences intense fear, helplessness, loss of control, and horror” [1, p.28]. Previous research has demonstrated upwards of 34% of women¹ report a traumatic birth [2,3]. The manifestation of birth trauma is rarely constrained to a single incident. Instead, it is often a cumulative experience of triggering events (e.g., series of distressing events in labor resulting in a vacuum extraction) and/or an experience that triggered past trauma (e.g., a common practice in maternity care such as an internal exam during pregnancy or labor on a survivor of sexual abuse). Although birth trauma can originate from such physical experiences, the subjective or psychological nature of the trauma may be of greater importance for consideration. As Beck described, trauma is in the “eye of the beholder” [1, p.32]. Two birthing people can both experience an emergency cesarean (C-section) birth, for example, but their perceptions of the experience can vary due to a range of factors; therefore, one may view this birth as traumatic while the other may not.

Just like not all individuals who experience trauma in everyday life will go on to develop posttraumatic stress disorder (PTSD), not all persons who experience trauma during birth will develop the symptoms and severity to meet criteria for PTSD following childbirth (PTSD-FC). In recent years, there has been growing research to identify the risk factors for PTSD-FC. Some such factors include: history of and current mental health disorders and/or trauma, parity, fear of childbirth, pregnancy health complications and loss, subjective labor experiences, type of birth, lack of support during birth [4–7]. Clinically, PTSD-FC is not distinguished in the Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-5) from PTSD, so clinicians must evaluate presenting symptoms and operationalize the disorder in the context of the perinatal period [11]. Prevalence rates can be difficult to detect in part from a lack of consensus of the “perinatal” timeframe as well as a lack of screening protocols; nevertheless, meta-analyses have demonstrated PTSD-FC to affect approximately 3–4% of women [1,4,6,7,12].

1.2. Birth trauma during COVID-19

Since COVID-19 was declared a pandemic in March of 2020 [13], stresses that are normally experienced in the perinatal period have been greatly exacerbated [14,15]. Various and ever-changing healthcare strategies were quickly employed for the prenatal, labor and birth, and postpartum periods in an attempt to protect the health and safety of birthing parents and their newborns [16–18]. Especially early on, these swift adjustments were intentionally cautious due to the uncertainty of how the virus would affect this vulnerable population, as it has been established that pregnancy brings physiological changes that can increase risk of infections and severity of symptoms [14,16]. In the U.S., policy changes included visitor restrictions, elimination or reduction of in-person health appointments with shifts to virtual visits, mask mandates, disruption or discontinuation of reproductive treatments, and, in some cases, prolonged separation from newborns [16,19,20]. Not

¹ We refer to women and mothers within the literature review in alignment of the extant research that specifically defines their study populations with such terms. Otherwise, we aim to use gender-inclusive language which is also representative of our study’s population in that while the majority identified as female, not all participants did. As such, we will use pregnant person or birthing person to recognize it is people with female physiology who carry pregnancies without perpetuating the marginalization of persons who birth who do not identify as women through our choice of language. This is aligned with some current reproductive literature [8–10].

surprising, perinatal mental health outcomes became a focus of attention due to the neonatal and obstetric guidelines put in place since the pandemic’s onset to address the potential symptoms and complications of COVID-19.

A comprehensive and systematic review of perinatal mental health outcomes summarizing data during the pandemic from 81 studies of pregnant and postpartum women demonstrated increased psychological symptoms, particularly symptoms of depression and anxiety [14]. The authors specifically identified two studies (one in Canada, one in the U.S.) comparing PTSD-FC symptoms before versus during the pandemic [21,22]. Both studies found increased trauma symptoms in birthing women during the pandemic. While these studies highlight the uptrend in psychological distress, specifically in trauma symptoms for birthing persons, the specific pandemic-related risk factors associated with these symptoms remain unknown.

It seems likely that pandemic-specific public health measures would be impacting the mental health outcomes for the perinatal population, as this has been exhibited in the greater population. For example, studies have demonstrated rising rates of anxiety, depression, and PTSD associated with national containment measures such as social distancing, quarantine, and isolation [23]. While these studies are important in adding to our understanding of the impacts of public health measures similar to those from previous pandemics (e.g., SARS and MERS), there is still a dearth of data about how public health restrictions unique to the perinatal population impact the birth experience in psychologically meaningful ways. According to Beck, “mothers’ perceptions of birth trauma can be based not only on the event, but also on the unmet expectations regarding the event” [1, p.35]. Policy changes associated with the pandemic have subsequently led to unexpected changes to pregnancy and birth planning. For example, in a recent study of 1400 pregnant women [17], 45.2% reported changing some aspect of their birth plan due to COVID-19. These changes fell into one of three categories: (i) modifying an existing hospital birth plan and accommodating new COVID-related policies, (ii) changing birth locations and/or providers, and (iii) other COVID-related concerns. While this information informs us about the prevalence of disruption to maternity care plans due to COVID-19 and the types of changes to perinatal healthcare, to date there has not been research to understand their psychological impacts on birthing parents.

We do not yet know how birthing individuals’ experiences of swift and significant healthcare policy changes during the COVID-19 pandemic have impacted traumatic births. As such, the aim of the present study was to survey individuals who received prenatal care and gave birth in the U.S. since March, 2020 to assess the impact of perinatal healthcare policy changes due to COVID-19 on birth-related PTSD using the City Birth Trauma Scale [24].

2. Materials and methods

2.1. Procedures

Cross-sectional data collection was conducted online from November 30, 2020 through May 15, 2021. Participants were recruited without compensation via convenience sampling through social media platforms, such as Facebook community groups targeting new parents, and shared via personal and professional contacts. Individuals were recruited who met the following criteria: (1) had a live birth since March, 2020; (2) received prenatal care and gave birth in the U.S.; and (3) were over the age of 18. Participants completed an anonymous, online survey to assess birth experiences as it related to (changes to) their birth plan, COVID-related restrictions and policies, and birth-related trauma.

Participants accessed an online, self-administered survey. Participation in the study was anonymous, and participants read the informed consent before completing questionnaires. The study included personal and birth-related demographic questions and the City Birth Trauma

Scale (CityBiTS) [24].

2.2. Personal and birth demographic questions

The demographic section of the survey asked questions about personal identity, such as gender, race, age, education and relationship status. Birth-related demographics asked about the type of provider(s) used for prenatal care and labor and birth; type of birth; obstetric intervention; preterm birth, and if their newborn(s) required neonatal intensive care. Additionally, participants were presented with questions asking what healthcare policy changes they experienced during prenatal care, labor and birth, and to their birth plan. For each question they were provided a list of potential changes in which they could select all options that applied (see Table 1 - COVID-19 Birth Changes). All demographic variables were categorical.

2.3. City Birth Trauma Scale (CityBiTS) [24]

The CityBiTS is a 29 item assessment to measure birth-related PTSD. This questionnaire was utilized to examine participants' most recent birth experience (i.e., during the COVID-19 health pandemic). Questions specifically ask about potential traumatic events during and immediately after labor and birth so the questionnaire can be used to understand diagnostic criteria and make diagnostic determinations of PTSD according to DSM-5: stressor criteria (A), symptoms of intrusion or re-experiencing the traumatic event (B), avoidance of things related to the traumatic event (C), negative alterations in cognitions and mood (D), and hyperarousal and reactivity (E), as well as duration of symptoms (F), significant distress or impairment (E), and exclusion criteria or other causes (e.g., medication, alcohol, drugs, or physical illness) (H). Additionally, CityBiTS can be used as an overall measure of PTSD symptoms by creating a continuous scale for total PTSD symptoms and two subscales. The two CityBiTS subscales include: (1) birth-related PTSD symptoms that include re-experiencing (B) and avoidance (C) symptoms and (2) general PTSD symptoms that include negative cognitions and mood (D) and hyperarousal (E) symptoms. For the total score and two subscales, higher scores indicate higher levels of PTSD symptoms. Reliability analyses for CityBiTS shows high internal consistency; Cronbach's α for clusters were high at .83–.88 for symptoms subscales and .92 for total symptoms [24]. Reliability analyses for the present sample were conducted and, similarly, there was high internal consistency for CityBiTS total scale ($\alpha = .93$), for CityBiTS birth related symptoms subscale ($\alpha = .91$), and CityBiTS general symptoms subscale ($\alpha = .91$).

2.4. Ethical considerations

This study received IRB approval (IRB 20-086). Participation was voluntary and informed consent to participate in the study was obtained electronically before participants could move forward to completing the questionnaires. All data was de-identified and stored in a password protected file only accessible to approved researchers to protect the privacy and confidentiality of participants.

3. Analyses

All analyses were run using SPSS version 21. Frequency distributions of demographic factors were initially run followed by bivariate and regression analyses to explore the research aims of the study. First, descriptive statistics were conducted to explore participant and birth demographics and PTSD frequencies using the CityBiTS total scale and subscales. Following, independent sample t-tests were run on all bivariate birth demographics and COVID-related birth changes to assess for significant indicators for CityBiTS PTSD symptoms and for the purposes of building a regression model of PTSD symptoms. Because of the large number of variables, Benjamini-Hochberg Procedure was used to control

for the false rate of discovery (B–H correction) [25]. As such, after running bivariate analyses, all variables were rank ordered by p-values and each variable's individual p-value was calculated using a false rate of discovery of .25. Those variables still having a significant effect were used in building a hierarchical regression model to predict PTSD symptoms. The model was created by entering two blocks of variables. The three labor and birth variables that were significant predictors of PTSD symptoms and were also the top ranked in order of significance after adjusting for the B–H correction were entered in the first block. The three birth plan variables that were significant predictors of PTSD symptoms after adjusting for the B–H correction were entered in the second block. Relevant assumptions of this analysis were tested; assumptions of multicollinearity were met. Variance inflation factor (VIF) ranged 1.01–1.09 and Durbin–Watson was 1.23 for the simultaneous model.

4. Findings

4.1. Participants

Three hundred and five responses were initially recorded. Due to the sensitive nature of the questionnaires, participants were not required to complete items and could discontinue the survey at any time. Participants who did not complete the personal and birth-related demographics section (appeared first in survey) were removed for analyses, as insufficient data was available for completing meaningful analyses. After removing these participants, the dataset included 269 participants (Table 1).

The study sample of participants gave birth between March, 2020 and April, 2021. The majority of participants (97.0%) gave birth to one child. For 40.9% of participants, this was their first pregnancy and for 50.2% their first living child. It had been less than 1 month since the birth for 7.4%, 1–3 months for 20.1%, 3–6 months for 37.5%, and 6 months or longer for 34.9%. Eight participants (3.0%) tested positive for COVID-19 during pregnancy, 3 (1.1%) tested positive at birth, and 9 (3.3%) tested positive since birth. For the vast majority of participants, they used an obstetrician-gynecologist for their prenatal care (80.3%) and/or their labor and birth (81.4%). While the majority of participants indicated a vaginal birth (without assistance; 64.7%), almost 40% of participants responded "yes" to the question "did you experience obstetric intervention (e.g., augmentation, forceps, vacuum extraction, C-section, episiotomy), as part of the birth?"

4.2. PTSD criteria

Total PTSD symptoms were calculated for the present sample, as well as birth-related PTSD symptoms and general PTSD symptoms. The possible range for total PTSD symptoms is 0–60. In the current sample, total PTSD symptoms ranged 0–53 ($M = 12.72$, $SD = 12.03$). Birth-related PTSD symptoms subscale has a possible range of 0–30, which was the current sample's range of scores ($M = 4.34$, $SD = 6.26$). General PTSD symptoms subscale also has a possible range of 0–30, which was also the current sample's range of scores ($M = 8.24$, $SD = 7.70$). Table 2 demonstrates the percentages of the present sample that met DSM-5 criteria (A–H) and full diagnostic criteria for PTSD.

Similar to previous research on PTSD-FC, three groups can be identified within the present sample based on severity of symptomology [25]. Within the present sample, one group met full diagnostic criteria (5.9%); a second group was partially symptomatic, reporting clinically significant symptoms on at least one criterion (Criterion A–E), but did not report all PTSD features (72.3%); and, a third group reported no symptoms of PTSD (21.9%).

4.3. Bivariate analyses

Independent t-tests were run on all dichotomous variables related to

Table 1
Participant demographics.

General participant demographics	N	%
Gender		
Female	265	98.5
Male	1	.4
Non-binary	1	.7
Other	2	.7
Race		
African American/African/Black/non-Hispanic	7	2.6
Asian or Pacific Islander	7	2.6
Hispanic/Latino/Chicano	17	6.3
Non-Resident (International)	1	.4
White/non-Hispanic	228	84.8
American Indian or Alaska Native	2	.7
Multiethnic	5	1.9
Other	2	.7
Age		
18–24	8	3.0
24–34	156	58.0
35–44	105	39.0
Highest Level of Education		
High School	18	6.7
Trade School/Vocational	3	1.1
Undergraduate/College	100	37.2
(Post)Graduate School	148	55.0
Relationship Status at Time of Birth		
Married/Living with partner	263	97.8%
Partnered/Not cohabitating	2	.7%
Single, separated, divorced	4	1.5%
Birth-related demographics		
	N ^a	%
Type of Provider(s) used for Prenatal Care		
Obstetrician-Gynecologist	216	80.3%
Maternal Fetal Medicine Specialist	73	27.1%
Family Practice Physician	9	3.3%
Midwife	68	25.3%
Doula	30	11.2%
Other	6	2.2%
Type of Provider(s) used for Labor & Birth		
Obstetrician-Gynecologist	219	81.4%
Maternal Fetal Medicine Specialist	18	6.7%
Family Practice Physician	4	1.5%
Midwife	57	21.2%
Doula	27	10.0%
Other	3	1.1%
Type of Birth		
Vaginal	174	64.7%
Assisted Vaginal (e.g., use of forceps)	13	4.8%
Cesarean	63	23.4%
Emergency Cesarean	19	7.1%
Obstetric Intervention		
Yes	107	39.8%
No	162	60.2%
Preterm Birth		
Yes	36	13.4%
No	233	86.6%
Newborn(s) Required Neonatal Intensive Care Unit		
Yes	48	17.8%
No	220	81.8%
COVID-19 birth changes		
	N ^b	%
Prenatal care		
Fewer in-person visits	161	59.9%
Use of telehealth visits in place of in-person visits	129	48.0%
Masks required	255	94.0%
Unable to attend childbirth classes	236	87.7%
Unable to tour birthing facility	190	70.6%
Other	31	11.5%
Labor & birth		
No support person(s) allowed	8	3.0%
One support person; same person throughout	229	85.1%
One support person; person could differ	6	2.2%
Limited length of stay for support person(s)	19	7.1%
COVID-19 testing	182	67.7%
Required to wear mask	148	55.0%
Required self-isolation prior to labor and birth	34	12.6%

(continued on next page)

Table 1 (continued)

COVID-19 birth changes	N ^b	%
Limited interaction/access to staff	61	22.7%
Separation from newborn	6	2.2%
Early discharge	71	26.4%
Other	54	20.1%
Birth plan		
Did not change birth plan/birth plan not changed due to COVID	152	56.5%
Changed location of birth (e.g., out of hospital birth)	11	4.1%
Changed support person(s) who were present for labor and birth	58	21.6%
Changed provider(s) for prenatal care	13	4.8%
Changed provider(s) for labor and birth	15	5.6%
Changed planned/anticipated method of birth (e.g., elective induction or cesarean birth)	22	8.2%
Change in breastfeeding plan	5	1.9%
Change in pain management and/or comfort measures during labor and birth	27	10.0%
Other	33	12.3%

^a Type of provider totals exceed participant totals because participants were able to endorse multiple providers.

^b Totals exceed participant totals because participants may have experienced multiple changes to their care.

Table 2
PTSD and DSM-5 criteria.

		'yes' answer n (%)
	Q1. Did you believe you or your baby would be seriously injured?	31 (11.9%)
	Q2. Did you believe you or your baby would die?	28 (10.8%)
Criterion A	Stressor Criterion: Q1 or Q2	41 (15.8%)
Criterion B	Re-experiencing symptoms	103 (40.4%)
Criterion C	Avoidance symptoms	49 (19.3%)
Criterion D	Negative cognitions and mood	139 (54.7%)
Criterion E	Hyperarousal	169 (66.5%)
Criterion F	Duration	187 (73.9%)
Criterion G	Distress and impairment	139 (57.9%)
Criterion H	Exclusion criteria	6 (2.5%)
	DSM-5 PTSD	14 (5.9%)

birth demographics and COVID-related birth changes to evaluate their influence on the CityBiTs total PTSD symptoms score (Table 3). Following, B–H critical values were calculated for each variable using a false discovery rate of .25 [25]. After adjusting for the B–H correction, the following six variables (listed in rank order) had significant effects on PTSD symptoms, with participants who endorsed these variables reporting higher rates of PTSD: limited length of stay for support person (s) during labor and birth ($p = .001$); one support person, same person throughout during labor and birth ($p = .003$); required to wear mask during labor and birth ($p = .003$); changed support person(s) who were present for labor and birth ($p = .006$); change in breastfeeding plan ($p = .008$); changed location of birth ($p = .009$). These variables were retained for building a regression model to examine perinatal effects of COVID-19.

4.4. Regression model

A hierarchical regression analysis was conducted to analyze the effect of COVID-related changes to participants' experience with labor and birth and birth planning on total PTSD symptoms (Table 4). Step 1 of the regression model included the following predictor variables for COVID-related labor and birth changes: limited length of stay for support person; being allowed only 1 support person who had to be the same; being required to wear a mask. Step 2 of the regression model consisted of the following predictor variables for COVID-related birth plan changes: support person(s) present for birth and labor; breastfeeding plans; location of birth. The overall regression model predicted approximately 19% of variance in total PTSD symptoms ($R^2 = .19$, $F(6,242) = 9.16$, $p < .001$). COVID-related labor and birth demographics (Step 1) predicted approximately 11% of variance in total PTSD symptoms, with all variables serving as significant predictors of PTSD. That is, participants who

positively endorsed these variables had higher rates of PTSD symptoms. After controlling for COVID-related labor and birth changes, Step 2 predicted approximately 8% of variance in total PTSD symptoms, with all variables being significant predictors of PTSD. That is, after controlling for labor and birth changes from COVID, these birth plan changes were predictive of higher PTSD symptom totals. While overall all the predictor variables entered into the regression model were significant, the strongest predictors of PTSD symptoms were related to support persons: with limited length of stay of support persons during labor and birth ($\beta = .208$, $p = .001$) and change in support persons for labor and birth ($\beta = .202$, $p = .001$) being the strongest, most significant predictors of symptomology. Following, mask mandates during labor and birth was the next most significant predictor ($\beta = .164$, $p = .006$).

5. Discussion

While previous studies have linked risk factors related to childbirth to PTSD-FC [4–7], examined the increased rates of trauma symptoms during COVID-19 [21,22], and examined birth plan alterations in the U. S. in response to COVID-19 [17], this study examined the intersecting experiences of these phenomenon. The present study explored birth experiences during the COVID-19 pandemic to examine the effects of perinatal healthcare changes on birth trauma in the U.S. Findings from the present study demonstrated frequency rates for PTSD-FC symptoms in a sample of participants who gave birth between March, 2020 – April 2021 and the COVID-related healthcare changes that contributed to participants' trauma symptoms.

Comparing the present sample of participants who gave birth during the COVID-19 pandemic with previous studies on PTSD-FC symptoms, all comparison criterion was found at higher rates. Comparing the present sample to previous studies: 40.4% reported re-experiencing symptoms compared to 12–15%, 19.3% reported avoidance symptoms compared to 2–7%, and 66.5% reported hyperarousal symptoms compared to 25–27% [3,26–29]. In terms of meeting diagnostic criteria for PTSD-FC, at 5.9% the present sample had a similar, but slightly higher rate as that of a recent, robust meta-analyses that found the prevalence rates of PTSD-FC to be approximately 3–4% [12]. While only a slightly higher percentage of the present sample met full diagnostic criteria for PTSD, the frequencies of participants meeting the requirements in the different diagnostic criterion is noteworthy (i.e., 72.3% were partially symptomatic). Indeed, there has generally been an assumption of homogeneity across individuals in the development of PTSD; however, newer research has demonstrated heterogeneity in the trajectory of trauma symptoms [30,31]. As such, there is value in not just looking at diagnostic threshold criteria for PTSD, but also recognizing that subthreshold presentations are associated with impairment in psychological functioning in the clinical range [32]. Additionally,

Table 3

T-Tests.

Variables	Yes			No			t(df)	p	Effect size (d)	B-H correction	
	N	M	SD	N	M	SD				Rank	(i/m) Q
Type of Birth ^a	74	14.372	12.657	175	12.023	11.737	-1.411(247)	.160	.192	15	.139
Obstetric Intervention	99	15.053	12.956	150	11.182	11.162	-2.435 (187.88)	.016	.320	9	.083
Preterm Birth	33	23.482	12.007	33	14.290	12.272	-.803(247)	.423	.757	17	.157
Neonatal Intensive Care Unit Prenatal Care	44	16.992	12.970	204	11.842	11.669	-2.602(246)	.010	.417	7	.065
Fewer in-person visits	150	13.919	12.400	99	10.906	11.274	-1.945(247)	.053	.254	12	.111
Use of telehealth visits	122	13.336	12.280	127	12.130	11.810	-.790(247)	.430	.100	19	.176
Masks required	237	12.791	12.009	12	11.333	12.965	-.381(11.98)	.710	.117	24	.222
Unable to bring support person(s) to prenatal appointments	219	12.662	11.952	30	13.152	12.810	.209(247)	.844	.040	25	.231
Unable to attend childbirth classes	163	13.593	12.751	86	11.069	10.410	-1.680 (205.32)	.094	.217	14	.130
Unable to tour birthing facility	178	13.106	12.394	71	11.766	11.103	-.799(247)	.425	.114	18	.167
Labor & Birth											
No support person(s) allowed	6	6.963	9.331	243	12.863	12.072	1.188(247)	.236	.547	16	.148
One support person; same person throughout	211	13.527	12.322	38	8.246	9.196	-3.078 (63.63)	.003	.486	2	.019
One support person; person could differ	5	8.600	6.024	244	12.806	12.117	.773(247)	.440	.440	20	.185
Limited length of stay for support person(s)	18	22.124	13.837	231	11.989	11.599	-3.520(247)	.001	.794	1	.009
COVID-19 testing	168	13.077	12.107	81	11.984	11.920	-.671(247)	.503	.091	21	.194
Required to wear mask	136	14.730	12.781	113	10.304	10.627	-2.984 (245.00)	.003	.377	3	.028
Required self-isolation prior to labor and birth	34	12.422	13.371	215	12.769	11.841	.156(247)	.876	.027	26	.241
Limited interaction/access to staff	57	15.945	13.820	192	11.764	11.313	-2.086 (79.57)	.040	.331	10	.093
Separation from newborn	5	9.156	11.100	244	12.794	12.061	.669(247)	.504	.314	22	.204
Early discharge	67	13.233	12.711	182	12.532	11.805	-.407(247)	.684	.057	23	.213
Birth Plan											
Changed location of birth	10	22.467	16.859	239	12.313	11.661	-2.646(247)	.009	.701	6	.055
Changed support person(s) who were present for labor and birth	53	17.499	14.580	196	11.429	10.935	-2.824 (68.60)	.006	.471	4	.037
Changed provider(s) for prenatal care	12	24.019	18.351	237	12.149	11.386	-2.219 (11.43)	.048	.777	11	.102
Changed provider(s) for labor and birth	14	21.881	18.601	235	12.175	11.354	-1.931 (13.58)	.075	.630	13	.121
Changed planned/anticipated method for birth	21	12.455	11.166	228	12.746	12.132	.106(247)	.916	.025	27	.250
Change in breastfeeding plan	5	26.778	15.946	244	12.433	11.808	-2.671(247)	.008	1.076	5	.046
Change in pain management and/or comfort measures	25	20.209	15.233	224	11.885	11.361	-2.651 (27.06)	.013	.619	8	.074

^a Collapsed birth type categories; yes = cesarean birth, no = vaginal birth.

Table 4

Hierarchical linear regression analysis.

Variable	Cumulative		Simultaneous	
	R ² change	F-change	β	p
<i>Step 1 – COVID-related labor and birth changes</i>	.11	F(3,245) = 9.94**		
Limited length of stay for support person			.208	.001
Same, one support person			.146	.015
Mask requirement			.164	.006
<i>Step 2 – COVID-related birth plan changes</i>	.08	F(3,242) = 7.58**		
Support person for labor and birth			.202	.001
Breastfeeding plan			.142	.018
Location of birth			.126	.036

** p < .001.

research has found similar help-seeking behaviors between those who are partially symptomatic and those who meet criteria for PTSD [33]; as such, clinicians must understand different trauma presentations and consider treatment needs based on criterion. For example, for the 40.4% of participants reporting symptom(s) of re-experiencing (Criterion B), clinicians must consider how to treat the intrusive memories and/or physiological responses associated with the traumatic aspects of the birth even if a person does not meet full diagnostic criteria for PTSD, as it is still possible the individual could experience impairment in psychological functioning. Indeed, 57.9% of the present sample indicated

experiencing functional distress or impairment.

Importantly, this study adds to both the extant birth trauma literature and perinatal mental health COVID-19 literature by examining the impacts of COVID-specific perinatal healthcare policy changes on PTSD symptoms. Findings from this study suggest the various restrictions to support persons can have a negative psychological impact on one's birth experience. This is not surprising, as there were many concerns from parents and professionals going into the pandemic about the visitor restrictions on birthing families' mental health [16,20]. Furthermore, research supports the trauma-related risks of a lack of support during the

birth process [5]. Supportive care in the form of emotional support, comfort measures, and advocacy may both enhance the physiological labor process (e.g., reduce need for obstetric interventions) and improve the subjective experience [34]. During the pandemic, a person in labor has been less likely to receive this type of continuous support because of the elimination of support teams and increased demands on medical staff [19]. It is difficult for one support person to continuously serve all the supportive roles for the birthing parent that would have otherwise extended across individuals (e.g., partner, family member, doula), and when changes occurred to parent's birth plans for support, this increased the risk for trauma. Additional risks for trauma included changes to breastfeeding plans and location of birth. While participants did not document the reason for these changes or what the changes were, the hoped for birth plan was not realized. Perceptions of birth trauma can be based not only on the event, but also on their unmet expectations of the event [1]. Understanding these various risk factors for childbirth during the pandemic may allow families and providers to better prepare when thinking about what they can and cannot control when developing birth plans in the context of current healthcare guidelines and restrictions [35].

Additionally, while COVID testing for labor and birth did not impact PTSD symptoms, for the participants in our study mask requirements did. This should be taken into consideration when weighing the risks and benefits of the added precaution of having the person giving birth wear masks during active labor. As recommended by The American College of Obstetricians and Gynecologists [36], individuals birthing in a hospital or birth center should wear a mask if they have COVID-19; however, wearing a mask may be difficult when they are pushing during labor. For this reason, during the pandemic the *healthcare team* should take the precautions of wearing masks and protective gear, such as goggles and/or face shields, to reduce the risk of spread [36]. This would additionally extend to any support person(s) present throughout the birth. Indeed, recommendations remain across professional organizations for those who are pregnant to follow general guidelines for wearing face coverings, regardless of vaccination status [37,38]; however, there is recognition of the physiological and psychological state that a person is in while giving birth. That is, this practical recommendation for the active phases of labor and birth may mitigate rates of spread, as mask mandates intend, while improving symptoms of trauma for people giving birth during the pandemic.

6. Clinical implications

We have long understood that perinatal mental health should be prioritized because of its short and long-term impacts. Similar to other studies examining birth trauma during the pandemic [21,22], we found the participants in this study to have striking rates of trauma symptoms. Therefore, there are a number of important considerations for (mental) health providers for how to best address individuals' needs both in the present, as well as in the event of another unexpected health pandemic.

6.1. Health providers

Health providers have the unique position of being able to provide trauma-informed care throughout an individual's reproductive journey. COVID-19 requires unique considerations in how health providers can collaboratively develop and honor birth plans to reduce the risk of birth trauma. An important protective factor against PTSD-FC is a parent's ability to be involved in the decision-making of their birth plan and when that plan is respected [7]. As one example, if hospital policies restrict a birthing parent to one support person and part of that parent's birth plan involves multiple supports, health providers could accommodate additional support persons through virtual options [15,16]. While we know of no current research on the outcomes of virtual support or virtual support combined with in-person support, this may reduce the risk of traumatic birth by increasing continuity of support. Furthermore,

health providers can advocate for vaccinated doulas without symptoms and/or those who test negative to be considered a part of a pregnant individual's care team, not counting as the one allowable support person as another means of increasing evidence-based continuous care [20,34].

6.2. Mental health providers

Before discussing mental health implications, it is important to note that since the start of the pandemic there has been a decrease in access to mental health services [39]. This is noteworthy because pre-pandemic treatment-seeking for parents in the perinatal period was already lower than the general population [40,41]. Therefore, while pregnant and postpartum people have experienced universally higher levels of distress and psychiatric symptomatology [14,42], there are likely increased treatment barriers that leave postpartum families at an even greater disadvantage to receiving adequate mental health support. Therefore, clinicians must consider the following recommendations in the context of *accessible* telementalhealth and/or safe in-person options.

Even though only 5.9% of the present sample met diagnostic criteria for PTSD, it is noteworthy for clinicians that trauma symptoms were creating distress or functional impairment in 57.9% of the present sample and 73.9% indicated experiencing symptoms for more than 1 month. The majority of participants endorsed trauma-related negative thoughts, feelings, or reactivity that began or worsened after birth. In clinical settings, screening protocols typically focus on postpartum depression (PPD); as such, clinicians may be more likely to attribute feelings of prolonged distress to PPD before considering PTSD [7]. Therefore, it is important to differentiate between various mental health disorders and employ the best treatment approaches based on symptomatology, recognizing that even if a person does not meet diagnostic criteria for PTSD, subthreshold presentations are associated with impairment in psychological functioning in the clinical range [32]. Furthermore, clinicians could assess for changes to clients' anticipated birth plan to identify clients at risk; changes to one's birth plan related to support person, breastfeeding, and location were found to be associated with higher levels of trauma symptoms in the present study.

Overall, in the treatment of PTSD-FC, mental health providers should take a trauma-informed approach by validating and understanding trauma symptoms as an adaptation and way of coping with the birth that is now getting in the way of present day functioning [43]. In addition to clinical treatment for PTSD-FC, peer support services can also be referred to promote a sense of community, engagement, and de-stigmatization [8]. Organizations such as Postpartum Support International [44] and Birth & Trauma Support Center [45] offer online groups that can still be accessed during the pandemic when in-person health concerns exist.

7. Limitations and future directions

A few limitations need to be considered before reaching conclusions for the present study. Due to online convenience sampling, the participant sample is restricted by self-selection and not representative of the whole U.S. population. Demographic characteristics indicate the sample to have a higher proportion of White individuals compared to the general U.S. population (76.3% vs. 84.8%) [46]. Additionally, the sample is more educated than the general population; 92.2 % of the present sample had a college degree or higher compared to 37.5% of the general population [47]. Higher rates of PTSD in a postpartum population have been found in birthing persons who are Black, have lower education, have lower incomes, and without private insurance [48]. Additionally, during COVID-19 there have been skewed outcomes amongst pregnant people of color and across lower socioeconomic status populations [17]. Thus, research should seek to understand the impact of perinatal healthcare policy changes across these social locations as it relates to PTSD-FC. Finally, this study focused on a sample of U.S. participants who gave birth during the pandemic. Future studies should explore the

experiences of birthing persons in other countries with different healthcare policies and maternity systems, as there have been notable critiques of the U.S.'s maternity care system and response to the pandemic.

8. Conclusion

Preparing for childbirth during the COVID-19 pandemic has been a stressful experience for families due to the unprecedented, unexpected changes to birth experiences [35]. While many studies have already demonstrated increased perinatal mental health concerns during the pandemic, the present study specifically demonstrates the significant impact COVID-related healthcare changes has on trauma symptoms following childbirth. While policies have understandably been put into place to mitigate physiological health risks, the psychological impacts must also be considered and weighed when implementing restrictive changes to the birth experience. Medical and mental health providers must be aware of the psychological risks to parents during the perinatal period in order to screen for PTSD-FC as well as take active steps themselves to reduce the potential for perpetuating trauma, particularly in the context of more restrictive healthcare guidelines.

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