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Pandemic Perceptions and Healthcare Decisions: Exploring Perceived COVID-19 Threat's Impact on Perinatal Healthcare in Florida

Farah Ulfat, BS[1], Sionika Thayagabalu, BS, BA[1], Alejandra Iglesias BS[1], Ke Xu, MS[1], Callie Reeder, MD[2], Erica Smith, MD[2], Michelle Cardel, PhD[1], Matthew Loop, PhD[3], Paola Rodriguez, PhD[4], Janitza Montalvo-Ortiz, PhD[5], Jaclyn Hall, PhD[1], Lauren Silva, MD[2], Marcella Rodriguez, DO[2], Tony Wen, MD[2], John Smulian, MD[2], Adetola Louis-Jacques, MD[2,6], Magda Francois, MABMH[1], Elizabeth Shenkman, PhD[1], Dominick Lemas, PhD[1,2,6]

The COVID-19 pandemic directly impacted well-being and healthcare delivery, but its indirect effects on health services utilization among pregnant women and new mothers remain less understood. Understanding how big events like pandemics impact health behaviors is essential for anticipating healthcare needs during future crises. This study examined how the perceived COVID-19 threat influenced health concerns and service utilization among 378 participants who were either pregnant or mothers of infants less than 12 months old, 18 years or older, and lived within a 50-mile radius of healthcare sites in the OneFlorida+ Clinical Research Consortium. An online Qualtrics survey assessed COVID-19 threat perception,

[1]Department of Health Outcomes and Biomedical Informatics, University of Florida College of Medicine, Gainesville, Florida. [2]Department of Obstetrics & Gynecology, University of Florida College of Medicine, Gainesville, Florida. [3]Department of Health Outcomes Research and Policy, Harrison College of Pharmacy, Auburn University. [4]Department of Psychiatry, University of Florida College of Medicine, Gainesville, Florida. [5]Department of Psychiatry, Yale School of Medicine, New Haven, Connecticut. [6]Center for Outcomes in Perinatal Research, College of Medicine, University of Florida. Funding: This work was supported by the National Institute of Diabetes and Digestive and Kidney Diseases (K01DK115632) and the University of Florida Clinical and Translational Science Institute (UL1TR001427). The content is solely the responsibility of the authors and does not necessarily represent the views of the University of Florida's Clinical and Translational Science Institute or the National Institutes of Health. Acknowledgments: Thanks to participants for their time and Thu Kim for data cleaning. Address correspondence to: djlemas@ufl.edu.

distress related to health and resource concerns (e.g., access to medicine, baby supplies, mental and general healthcare, and social interactions), and changes to health service utilizations (e.g., induction schedule, hospital/birthing center choices, prenatal provider, and visit frequency) during the pandemic. Participants who perceived COVID-19 as a significant threat were more likely to report concerns about reduced access to general healthcare (p = 0.043). Pregnant participants, compared to mothers with infants under 12 months of age, expressed greater concern about reduced access to mental healthcare (p = 0.015).

Additionally, the perceived COVID-19 threat was linked to changes in prenatal care providers and labor induction schedules ($p < 0.001$). These findings highlight the importance of integrating the perceived threat of pandemics or other major events into mental health screenings. Healthcare providers should proactively address potential changes in patient behavior during major events in anticipation of future crises.

Keywords: pregnancy, COVID-19, mental healthcare, prenatal healthcare utilization, perceived COVID-19 threat

COVID-19 has profoundly affected healthcare systems, societal structures, and the global economy (Filip et al., 2022). Among perinatal populations, the virus has notably increased health risks, such as premature rupture of membranes, preterm labor, fetal tachycardia, and fetal distress during the third trimester of pregnancy (Rasmussen et al., 2020; Wei et al., 2021). As a result, pregnant women were advised to alter their routines to reduce exposure, including avoiding crowded places, public transportation, and contact with individuals infected with COVID-19 (Aghababaei et al., 2020). Beyond the immediate physical health risks, substantial evidence shows that the pandemic has severely impacted mental health and well-being (Aghababaei et al., 2020; Folkman & Greer, 2000; Giuntella et al., 2021; Groulx et al., 2021; Mo et al., 2021; Moyer et al., 2020; Paredes et al., 2021; Shen et al., 2022; Vanstone et al., 2023). The combination of heightened health risks and psychological stressors has amplified mental health concerns for pregnant women, underscoring the urgent need for comprehensive support strategies.

Pregnancy involves significant hormonal changes. Mental health issues, like depression and anxiety, can complicate both childbirth and the well-being of mother and child (Chauhan & Potdar, 2022). Maternal depression can manifest as low self-confidence, loss of interest, apathy, feelings of worthlessness, and difficulty concentrating (Chauhan & Potdar, 2022). Unexpected events, such as the COVID-19 pandemic, can further exacerbate stress-related symptoms, including worry, depression, anxiety, and post-traumatic stress disorder (PTSD), all of which negatively impact the mental health of pregnant patients and the health of the fetus (Paredes et al., 2021). These stress responses are likely influenced by disrupted healthcare systems, reduced provider visits, and lifestyle changes necessitated by the pandemic (Filip et al., 2022). Individuals with a heightened perception of threat are at increased risk of worry, depression, anxiety, and PTSD (Paredes et al., 2021). Perceived COVID-19 threat refers to an individual's perception that the pandemic negatively impacts their life (Paredes et al., 2021).

The COVID-19 pandemic can be considered a ***Big Event***, a large-scale, abnormal event that causes widespread shifts in populations' norms, beliefs, and behaviors (Friedman et al., 2021). Examples of these Big Events include war, hurricanes or other large natural disasters, economic collapses, or pandemics (Friedman et al., 2021). The health effects of Big Events are uncertain, so retrospective analysis of past pandemics and other large-scale events is essential to understanding the resulting social changes. Researchers note that analyzing variables like changes in institutional structures, individual experiences, and normative expectations could help us better understand the health impact of Big Events (Friedman et al., 2021). Therefore, exploring individual maternal experiences linked to the perceived COVID-19 threat has the potential to offer valuable insights for effectively allocating resources to perinatal health during future crises.

Data shows that pregnant patients experienced heightened anxiety and depressive symptoms during the pandemic compared to pre-pandemic levels (Moyer et al., 2020). Additionally, disruptions in prenatal care, including appointment cancellations and changes in birthing plans, have exacerbated these mental health challenges (Groulx et al., 2021). Previous studies have explored risk perception in decision-making regarding preventive behaviors and vaccination outcomes in perinatal populations, but they often fail to consider the role threat perception plays in healthcare utilization (Aghababaei et al., 2020; Mo et al., 2021; Shen et al., 2022; Vanstone et al., 2023).

The heightened concerns about mental health care during times of pandemic-related distress and healthcare disruptions underscore the importance of exploring the role of perceived threat during pregnancy (Filip et al., 2022; Giuntella et al., 2021). While prior research has established links between COVID-19, healthcare disruptions, and increased stress-related symptoms, there are limited studies that account for threat perception as a potential mediating variable (Aghababaei et al., 2020; Mo et al., 2021; Shen et al., 2022; Vanstone et al., 2023). Our study aimed to build on existing literature by investigating the intersection of perceived COVID-19 threat and healthcare utilization among pregnant patients (Filip et al., 2022; Giuntella et al., 2021; Rochelson et al., 2020).

We evaluated the association between perceived threat and healthcare utilization among pregnant patients and mothers of infants under 12 months in Florida, leveraging the OneFlorida+ Clinical Research Consortium. With more than 200,000 births recorded annually, Florida ranks fourth in the nation for annual births, making the OneFlorida+ clinical research consortium ideal for data collection (Xu et al., 2023). Given Florida's substantial birth rate, understanding the relationship between perceived COVID-19 threat and healthcare utilization in perinatal populations is crucial for informing future public health strategies and preparing for future Big Events.

Method

To be eligible for the study, participants had to be cisgender females, 18 years or older, pregnant or have an infant younger than 12 months of age, and residing within 50 miles of a site participating in the OneFlorida+ Clinical Research Consortium (Xu et al., 2023). The OneFlorida+ Clinical Research Consortium is a statewide partnership of 11 Florida health systems, providers, and insurers. It encompasses a broad and diverse population across various health systems in Florida. The OneFlorida+ sites selected for inclusion included Tallahassee, Jacksonville, Gainesville, Orlando, Tampa, and Miami (OneFlorida Clinical Research Consortium, 2024; Xu et al., 2023). Recruitment and survey administration were managed through Qualtrics, a commercial survey platform (Qualtrics, Provo, UT). Recruitment of target participants was based on qualifying demographic characteristics (e.g., race, age, gender) reported on user profiles to reflect our target audience and to ensure the findings are relevant to the populations of interest. Participants who met eligibility

requirements (pregnant or had an infant younger than 12 months of age) were invited to participate and sent an active survey link to the consent page and survey instrument. Once the pre-screening was passed, the participants took a 30-minute virtual Qualtrics survey. The study was approved by the University of Florida's Institutional Review Board.

The questionnaires assessed participants' perceptions of the COVID-19 threat and their concerns about health and resources during the pandemic. The questionnaires were constructed by integrating previously published scales and questions, such as sociodemographic questions, along with adapted measures aimed at gathering information on perceptions and experiences with clinical research using the Health Information National Trends Survey (HINTS) (Hesse et al., 2006, Xu et al., 2023). Demographic and perinatal information included maternal age, parity, education level, race and ethnicity, household income, health insurance status, Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) eligibility, and relationship status.

Perceived COVID-19 threat was measured using a 5-point Likert scale, with responses of "strongly agree" and "agree" combined into an "agree" category and "strongly disagree" and "disagree" combined into a "disagree" category. Responses of "refuse to answer" and "don't know" were excluded from the analysis due to the ambiguity of the response. Responses were combined to increase the statistical power by increasing the sample size and to identify general trends among our populations that would otherwise be unclear from nuanced differences in opinions.

Participants also reported their level of concern regarding reduced access to medicine, baby supplies, mental healthcare, general healthcare, and diminished social interactions using a 4-point Likert scale. Responses of "moderately distressing" and "highly distressing" were combined into a "distressing" category, and responses of "not of concern" and "not distressing" were combined into a "not distressing" category. Participants indicated any changes in their prenatal care and birth plans due to the pandemic, specifying whether changes in C-section or labor induction schedules, hospital or birthing centers, prenatal healthcare providers, and visit frequency. These changes were categorized as elective (proactive changes made by the participant), required (changes mandated by hospital or provider), or no change (no adjustments).

Data was collected between April and September 2020 and managed using REDCap electronic data capture tools (Harris et al., 2009, 2019). The survey data was transferred by another to ensure accurate data validation. Statistical

analysis included Pearson's Chi-squared test, performed using R version 4.0.5 via the RStudio interface 1.3.1056 (R: The R Project for (Statistical Computing, 2024). Specifically, gtsummary was utilized for descriptive statistics (Sjoberg, 2021). Chi-squared tests were used to examine associations between perceived COVID-19 threat ("agree" or "disagree") and health service access and utilization outcomes.

Results

Of the 378 participants, 267 (70.6%) perceived COVID-19 as a threat, while 111 (29.4%) did not. Among those who perceived COVID-19 as a threat, 149 (55.8%) were mothers of infants under 12 months, and 17 (6.4%) were pregnant and mothers of infants under 12 months. In contrast, of the 111 participants who did not perceive COVID-19 as a threat, 50 (45.1%) were pregnant, 56 (50.4%) were mothers of infants under 12 months, and 5 (4.5%) were both pregnant and mothers of an infant under 12 months (Table 1).

Table 1

Demographics

Agree or Disagree That COVID-19 is a Threat	**Total (*n* = 378)**	***%***	**Agree (*n* = 267)**	***%***	**Disagree (*n* = 111)**	***%***	***p*-value**[1]
Perinatal Status							0.386
Pregnant	151	40	101	37.8	50	45.1	
Mother	205	54.2	149	55.8	56	50.4	
Pregnant and Mother	22	5.8	17	6.4	5	4.5	
Recruitment Method							0.026
Other	170	45	133	49.8	37	45.1	
Social Media	131	34.7	81	30.3	50	33.3	
Email	47	12.4	33	12.4	14	12.6	
Word of Mouth	19	5.0	14	5.3	5	4.5	
Phone Call	11	2.9	6	2.2	5	4.5	

Agree or Disagree That COVID-19 is a Threat	**Total (*n* = 378)**	***%***	**Agree (*n* = 267)**	***%***	**Disagree (*n* = 111)**	***%***	***p*-value**[1]
Maternal Age							0.014
18 - 24 Years	115	30.4	74	27.7	41	36.9	
25 - 34 Years	180	47.6	139	52.1	41	36.9	
35 - 44 Years	73	19.3	45	16.9	28	25.2	
45+ Years	10	2.6	9	3.3	1	1	
Parity							0.010
0	67	17.7	50	18.8	17	15.3	
1	98	26	69	25.8	29	26.2	
2	91	24	74	27.7	17	15.3	
3+	122	32.3	74	27.7	48	43.2	
Highest Education							0.00035
Graduate Degree	86	22.8	48	18.0	38	34.2	
Undergraduate Degree	182	48.1	138	51.7	44	39.6	
High School Degree	91	24.1	69	25.8	22	19.8	
8th Grade or Less	3	0.8	0	0	3	2.7	
Technical or Vocational Degree	15	4	12	4.5	3	2.7	
N/A	1	0.2	0	0	1	1	
Maternal Race							0.452
White	222	58.7	160	59.9	62	55.8	
Black	73	19.3	47	17.6	26	23.4	
Asian	16	4.2	14	5.2	2	1.8	
Native	6	1.6	4	1.5	2	1.8	
Hawaiian	2	0 .5	1	0.4	1	1	
Multiple	43	11.4	28	10.5	15	13.5	
Other	16	4.3	13	4.9	3	2.7	

Agree or Disagree That COVID-19 is a Threat	Total (*n* = 378)	%	Agree (*n* = 267)	%	Disagree (*n* = 111)	%	*p*-value[1]
Maternal Ethnicity							0.141
Not Hispanic	259	68.5	189	70.8	70	63.1	
Hispanic	119	31.5	78	29.2	41	36.9	
Household Income							0.350
$0 - $37,000	133	35.2	93	35.8	40	36.0	
$37,001 - $75,000	152	40.2	114	42.6	38	34.3	
$75,000 or Higher	86	22.8	55	20.6	31	27.9	
N/A	7	1.8	5	1.9	2	1.8	
Health Insurance							0.214
Medicaid	158	41.8	114	42.7	44	39.6	
Private	160	42.3	106	39.7	54	48.7	
Other	22	5.8	20	7.5	2	1.8	
Military	13	3.4	9	5.2	4	3.6	
No Insurance	18	4.8	14	3.4	4	3.6	
N/A	7	1.9	4	1.5	3	2.7	
WIC Eligibility							0.367
Yes	221	58.5	150	56.2	71	64.0	
No	116	30.7	87	32.6	29	26.0	
N/A	41	10.8	30	11.2	11	10.0	
Relationship Status							0.026
Engaged or Married	227	60.1	157	58.8	70	63.1	
Committed Relationship	102	27.0	80	30.0	22	19.8	
Single	42	11.1	27	10.1	15	13.5	
Separated or Divorced	5	1.3	3	1.1	2	1.8	
Widowed	2	0.5	0	0	2	1.8	

Note. [1] Pearson's Chi-squared test.

There was a significant association between maternal age and perception of COVID-19 threat (p = 0.014). The age group 25-34 years, which included 47.6% of participants (n = 180), was most likely to perceive COVID-19 as a threat at 52.1% (n = 139). A significant association was found between the highest level of education and the perception of COVID-19 as a threat (p = 0.00035). Participants with a graduate degree constituted 22.8% (n = 86), undergraduate degree 48.1% (n = 182), and high school diploma 24.1% (n = 91).

Most participants were White (58.7%, n = 222). Hispanic participants comprised 31.5% (n = 119) compared to 23% in the OneFlorida+ Research Consortium. There was a significant association between relationship status and COVID-19 threat (p = 0.026). Most participants (87.1%, n = 329) were in committed relationships. Of those who perceived COVID-19 as a threat, 88.8% (n = 237) were in committed relationships, compared to 83% (n = 92) of those who did not perceive COVID-19 as a threat (Table 1). Among the 378 participants, 70% (n = 267) perceived COVID-19 as a threat. Perceived COVID-19 threat was associated with concerns of reduced access to general health care ($p < 0.05$) (Table 2).

Table 2

Perceived COVID-19 Threat and Concerns About Future Access to Health Resources in Pregnant Women and Mothers of Infants Less Than 12 Months

Resource Concerns	**Total (n = 378)**	**Agree that COVID-19 is a threat (n = 267)**	**Disagree that COVID-19 is a threat (n = 111)**	***p*-value[1]**
Reduced Access to Medicine in The Future				0.266
Distressing	204 (54%)	149 (56%)	55 (50%)	
Not Distressing	174 (46%)	118 (44%)	56 (50%)	
Reduced Access to Baby Supplies in The Future				0.076
Distressing	237 (63%)	175 (66%)	62 (56%)	
Not Distressing	141 (37%)	92 (34%)	49 (44%)	

Resource Concerns	Total (*n* = 378)	Agree that COVID-19 is a threat (*n* = 267)	Disagree that COVID-19 is a threat (*n* = 111)	*p*-value[1]
Reduced Access to Mental Health Care In The Future				0.141
Distressing	206 (54%)	152 (57%)	54 (49%)	
Not Distressing	172 (46%)	115 (43%)	57 (51%)	
Reduced Access to General Healthcare In The Future				0.015
Distressing	210 (56%)	159 (60%)	51 (46%)	
Not Distressing	168 (44%)	108 (40%)	60 (54%)	
Reduced Access to Positive Social Interactions Due to Social Distancing or Quarantine				0.475
Distressing	215 (57%)	155 (58%)	60 (54%)	
Not Distressing	163 (43%)	112 (42%)	51 (46%)	

Note. [1] Pearson's Chi-squared test.

Among the 173 pregnant participants, 68% (*n* = 118) perceived COVID-19 as a threat. Pregnant participants who perceived COVID-19 as a threat expressed greater concern for reduced access to mental health care (*p* = 0.043) (Table 3).

Table 3

The Association Between Perceived COVID-19 Threat and Future Access to Health Resources in Pregnant Women Only

Resource Concerns	Total (*n* = 173)	Agree that COVID-19 is a threat (*n* = 118)	Disagree that COVID-19 is a threat (*n* = 55)	*p*-value[1]
Reduced Access to Medicine in The Future				0.617
Distressing	96 (55%)	67 (57%)	29 (53%)	
Not Distressing	77 (45%)	51 (43%)	26 (47%)	
Reduced Access to Baby Supplies in The Future				0.311
Distressing	107(62%)	76 (64%)	31 (56%)	
Not Distressing	66 (38%)	42 (36%)	24 (44%)	
Reduced Access to Mental Health Care in The Future				0.043
Distressing	101(58%)	75 (64%)	26 (47%)	
Not Distressing	72 (42%)	43 (36%)	29 (53%)	
Reduced Access to General Healthcare in The Future				0.071
Distressing	99 (57%)	73 (62%)	26 (47%)	
Not Distressing	74 (43%)	45 (38%)	29 (53%)	
Reduced Access to Positive Social Interactions Due to Social Distancing and Quarantine				0.875
Distressing	96 (55%)	65 (55%)	31 (56%)	
Not Distressing	77 (45%)	53 (45%)	24 (44%)	

Note. [1] Pearson's Chi-squared test.

Participants who perceived COVID-19 as a threat were less likely to make elective changes to their C-section and labor induction schedules or prenatal healthcare providers ($p < 0.001$). Additionally, hospital and birthing centers were

not frequently changed among those who perceived COVID as a threat. In contrast, participants who disagreed that COVID-19 was a threat required cancellations or reduction in prenatal care visits more frequently than those who perceived COVID-19 as a threat (Table 4).

Table 4

Perceived COVID-19 Threat and Health Service Utilization in Pregnant Women Only

Resource Concerns	**Total (*n* = 173)**	**Agree that COVID-19 is a threat (*n* = 118)**	**Disagree that COVID-19 is a threat (*n* = 55)**	***p*-value[1]**
Change In C-Section or Labor Induction Schedule				<0.001
Required Change	43 (25%)	27 (23%)	16 (29%)	
Elective Change	55 (32%)	28 (24%)	27 (49%)	
No Change	75 (43%)	63 (53%)	12 (22%)	
Change Hospitals or Birthing Center				0.002
Required Change	43 (25%)	24 (20%)	19 (35%)	
Elective Change	42 (24%)	23 (19%)	19 (35%)	
No Change	88 (51%)	71 (60%)	17 (31%)	
Change Prenatal Health Care Providers				<0.001
Required Change	41 (24%)	23 (19%)	18 (33%)	
Elective Change	45 (26%)	23 (19%)	22 (40%)	
No Change	87 (50%)	72 (61%)	15 (27%)	
Cancellation of or Reduction in Frequency of Prenatal Visits				0.002
Required Change	65 (38%)	38 (32%)	27 (49%)	
Elective Change	37 (21%)	21 (18%)	16 (29%)	
No Change	71 (41%)	59 (50%)	12 (22%)	

Note. [1] Pearson's Chi-squared test.

Discussion

Our study provides a unique insight into healthcare service utilization among pregnant patients and mothers of infants under 12 months of age during the COVID-19 pandemic. A significant majority of participants (70.6%) perceived COVID-19 as a threat, and this perception was strongly linked to concerns over reduced access to both general and mental health care services. Notably, those who viewed COVID-19 as a threat were less likely to make elective changes to their C-section or labor induction schedules compared to those who did not perceive COVID-19 as a threat.

Florida declared a public health emergency in response to the COVID-19 pandemic on March 1, 2020, which led to significant disruptions across the healthcare system (Florida – Coronavirus State Actions, 2020). Despite efforts to maintain healthcare flexibility, Florida experienced multiple COVID-19 surges (Florida Passes 100,000 COVID-19 Cases, 2020). Our data, collected during one of the early pandemic spikes, underscores the critical need to understand health service utilization during large-scale public health crises. While previous studies have explored decision-making in pregnant populations (Aghababaei et al., 2020; Mo et al., 2021; Shen et al., 2022; Vanstone et al., 2023), our study provides new information on the specific link between perceived COVID-19 threat and healthcare utilization. Our findings align with prior research by showing that concerns related to COVID-19 significantly influenced healthcare access and decision-making (Groulx et al., 2021; Javaid et al., 2021; Rochelson et al., 2020; Vanstone et al., 2023). Pregnant women in our study also reported feeling a lack of support due to limited healthcare interactions, highlighting the widespread impact of the pandemic on mental health and the critical need for increased mental health support (Cameron et al., 2020; Javaid et al., 2021; Preis et al., 2020).

The Health Belief Model provides a useful framework for interpreting our findings by suggesting that perceived threat plays a key role in healthcare decision-making (Jones et al., 2015). According to the model, an individual's actions are influenced by the perception of the severity of a disease and the balance between perceived benefits and barriers of certain health behaviors. Our findings suggest that participants who perceived COVID-19 as a serious threat were less likely to make elective changes to their birth plans, likely due to perceived risks outweighing the potential benefits of altering their plans.

Retrospective analyses of the COVID-19 pandemic offer valuable insights into the impact of Big Events on perinatal health outcomes and healthcare utilization (Friedman et al., 2021). By examining factors such as prenatal care and birth plan choices, our study contributes to the growing knowledge of how major crises impact healthcare choices. A Big Event is any large-scale, abnormal occurrence that disrupts health norms, beliefs, social support, and behaviors (Friedman et al., 2021). Big events may include war, natural disasters, large-scale recessions, or pandemics (Friedman et al., 2021). While some Big Events have been more thoroughly studied, significant gaps remain. For instance, research on hurricane exposure has found associations with pregnancy complications, preterm birth, low birth weight, cesarean birth, and abnormal newborn conditions, though inconsistencies in study design and the type of hurricane exposure call for further investigation (Jeffers & Glass, 2020). Clarifying these outcomes may require a deeper analysis of resource concerns and specific health service utilization, as our study does.

Our study makes a significant contribution to the field by examining how patient threat perceptions influence the use of physical and mental health services among pregnant and postpartum women during a crisis. Our study results provide a more thorough understanding of choices related to healthcare utilization in patients. By exploring connections like threat perceptions during large-scale events, we can better prepare healthcare professionals to maintain strong patient relationships and continuity of care during crises. Collecting data on pregnancy and healthcare choices during COVID-19 strengthens our understanding of populations in crisis and informs how we can allocate resources and funding more effectively in future large-scale public health emergencies.

The strengths of our study include its focus on perceived COVID-19 threats and their impact on health service utilization. Our study successfully identified a need for improved mental healthcare access for pregnant patients during pandemics and examined changes in prenatal care decisions. However, the cross-sectional design limits our ability to assess the long-term effects of the pandemic. Additionally, the lack of pre-pandemic mental health data and reliance on self-reported questionnaires instead of clinical measures are limitations that should be addressed in future studies. Online recruitment may also introduce bias, particularly affecting generalizability (Jang & Vorderstrasse, 2019). Future research should include longitudinal studies to assess the long-term impacts of pandemics on healthcare utilization and mental

health. Incorporating clinical mental health measures and expanding recruitment to mitigate bias would enhance the robustness of future findings. Additionally, integrating mental healthcare specialists into healthcare services for women and children could improve support during pandemics.

Conclusion

Our study highlights the associations between perceived COVID-19 threat and concerns about reduced access to general and mental health care. The findings indicate a need for proactive measures to address mental health concerns and adapt healthcare delivery during pandemics and other Big Events. We recommend that healthcare systems incorporate mental healthcare specialists to support pregnant women and new mothers better during such crises.

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