"Coronavirus Has Changed Everything": Emotional Experiences During Pregnancy, Birth and the Postpartum Period Among Women Impacted by COVID-19

By:

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Abstract

Background: The COVID-19 pandemic may have a unique emotional impact on pregnant people. There is limited qualitative data on the lived psycho-social and emotional experiences of COVID-19+ pregnant and postpartum people during the pandemic.

Objective: This cross-sectional study, which employed qualitative methodology, seeks to address this gap and characterize the emotional effects of the COVID-19 pandemic on pregnant and recently pregnant patients in the Boston area who had either suspected or confirmed COVID-19 infection during the initial four months of the pandemic.

Methods: Pregnant and recently pregnant individuals (n=20) from Massachusetts General Hospital obstetrics and gynecology clinical sites with suspected or confirmed COVID-19 infection were interviewed about their experiences during the COVID-19 pandemic. Interviews were transcribed and coded using NVivo 12 software. Using data display matrices, thematic analysis was performed to identify emergent, cross-cutting themes.

Results: The final sample consisted of 20 pregnant and postpartum participants who were predominantly white (65%), multigravidas (60%), married (80%), and tested positive for COVID-19 (55%). The most frequently described emotions were anxiety (90%), uncertainty (80%), fear (70%), relief (65%), and sadness (60%). The following three cross-cutting themes were identified: risk, protection, and change. The ways in which participants articulated their emotional reactions to the themes of risk, protection, and change were complex and varied.

Significance: There was a broad range of negative and positive emotional experiences of pregnancy, birth, and the postpartum period during the first four months of the COVID-19 pandemic. A better understanding of pregnant people's emotional experiences may lead to

changes in clinical practice and institutional policies that are more supportive of their needs and congruent with their values.

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1. Introduction

Background:

The COVID-19 pandemic has generated unprecedented stress,[1] uncertainty,[2] fear,[3] loss, trauma,[4] and grief,[5,6] which may uniquely affect the mental health and emotional wellbeing of pregnant people.[7,8] Even in non-pandemic times, the perinatal period can be a socially vulnerable and emotionally stressful time,[9] and confers an increased risk of psychiatric complications.[10] The threats of the COVID-19 pandemic have intensified many of the stressors of pregnancy. Recent data has shown pregnant people are at an increased risk for severe COVID-19 disease.[11] Further, when COVID-19 is acquired during pregnancy, it has been associated with increased risk of adverse perinatal outcomes,[12] including higher rates of caesarean section.[13] Adverse perinatal outcomes, regardless of the cause, are associated with worse emotional and psychological health in the postpartum period.[14] Thus, COVID-19 infection and any COVID-associated complication that occur during pregnancy or birth may negatively impact the emotional health and psychological wellbeing of pregnant and recently pregnant individuals.[15] Even among pregnant people who have not been infected by COVID-19, studies have found high levels of emotional distress and fear concerning their risk of COVID-19 infection.[16,17]

Pregnant people—even those who have not directly experienced COVID-19 infection—have also faced significant disruptions to health and social networks, which may have pernicious effects on their mental health and emotional wellbeing. Given the heightened risks of both severe COVID-19 disease in pregnancy and potential adverse perinatal outcomes, numerous institutional restrictions were put in place at the beginning of the pandemic, including strict infection control policies for prenatal care visits,[18] deliveries and postpartum appointments.[19] Examples of these strict infection control policies include switching in-person postpartum visits

to telehealth appointments;[20] allowing one support person into the delivery room;[21] banning any support personnel including spouses, partners, and doulas, from the delivery room;[22] and implementing neonatal separation policies for birthing people with suspected or confirmed COVID-19.[23] Emerging data have explored the effect of infection control policies on maternal mental health, showing that COVID positive mothers who experienced immediate postpartum separation from infants reported higher levels of psychological distress.[24] News media coverage has also highlighted powerful stories of individuals who gave birth in isolation, underscoring the devastating effects of infection control birthing policies.[22]

In addition to changes in healthcare system policies and practices, public health social distancing guidelines throughout the pandemic, including stay at home orders and quarantine protocols, have created economic devastation, disruptions in daily routines,[25] and fragmented social support networks, compounding the stress and fear with isolation[26] and loneliness.[27,28] The increased isolation resulting from the pandemic may have a particularly detrimental effect on the emotional wellbeing of pregnant, birthing, and postpartum people.[29,30] Pregnancy and birth are not only medical, but also psycho-social and emotional experiences that occur within broader social networks.[31] Social support has been shown to play a vital role during pregnancy, delivery, and the postpartum period, and is associated with improved perinatal mental health outcomes.[32,33] Thus, disruptions in social support networks, especially for pregnant people who contracted COVID and were forced to quarantine from immediate family members, may have particularly harmful effects on pregnant and postpartum individuals' psychological health and wellbeing.[34]

Recent studies show a rising incidence of perinatal mood disorders, including postpartum depression and anxiety, during the COVID-19 pandemic.[35,36] One cross sectional study of a high-

volume obstetric center in Italy found that from March 8 - June 15, 2020, over 40% of people who birthed in an epidemic area experienced post-partum traumatic stress symptoms.[37] Some research has suggested that the rising rates of perinatal anxiety and depression may lead to adverse birth outcomes.[38,39] Much of the research on pregnant people's mental and emotional health during the pandemic has been quantitative.[38,40]

However, there is a dearth of qualitative literature on pregnant and postpartum people's broader psycho-social experiences and emotional states—even in the absence of psychopathology—throughout the COVID-19 pandemic. Furthermore, there is limited data on the lived emotional experiences of COVID positive pregnant and recently pregnant people. In this cross-sectional study using qualitative methods, I sought to address this gap in the literature and describe the emotional experiences of COVID-19 on pregnant and recently pregnant individuals in the United States who had either confirmed or suspected COVID-19 infection.

Objective:

The objective of this cross-sectional study was to qualitatively analyze the range of emotions described by U.S. pregnant and recently pregnant (withing 6 months) people who received care at Massachusetts General Hospital and had either suspected or confirmed COVID-19 infection from March 2020-July 2020. In this study, I analyzed a subset of data from the larger qualitative study, "Experiences of Pregnancy and Birth Among Women Impacted by COVID-19" (PI Goldfarb), which examines the experiences of pregnancy, birth, and postpartum care among individuals who received care within the Massachusetts General Hospital System. The first case of COVID-19 in Massachusetts was reported on February 1, 2020.[41] Subsequently, Massachusetts became a COVID-19 hotspot in the pandemic. This dataset examines the

experiences of pregnant and recently patients in the greater Boston area during the first four months of the COVID-19 pandemic—a time when very strict infection control policies and social distancing recommendations were widespread in the area.

2. Methods

The data for this analysis were obtained between April 2020 and August 2020, and are part of the broader qualitative study, "Experiences of Pregnancy and Birth Among Women Impacted by COVID-19" (PI Goldfarb), which was approved by the Massachusetts General Hospital Institutional Review Board. This secondary data analysis of pregnant and recently pregnant people's emotional and psychological experiences was approved by the University of North Carolina at Chapel Hill Institutional Review Board. I employed qualitative research methods[42] to capture a broad range of themes related to participants' emotional experiences. It was beyond the scope of my study to provide prevalence estimates of views, emotions, or experiences among a representative sample of pregnant people. Therefore, qualitative methodology, which seeks to deeply explore themes[42] rather than offer prevalence estimates, was an appropriate approach.

2.1 Study Population:

All patients within the Massachusetts General Hospital (MGH) system who are "persons under investigation" (PUI)—meaning either suspected or confirmed COVID-19 positive—are tracked on a clinical database. Pregnant and recently pregnant patients who were PUI were identified by a research coordinator by reviewing the clinical database. Patients were approached during a regular visit by clinic staff to participate in the study. Clinic staff then notified a

research of potentially interested participants. A research assistant contacted interested persons. Eligibility criteria for this study included pregnant or recently pregnant people aged 18-45 years who were persons under investigation for COVID according to the MGH clinical database.

2.2 Process and Data Collection

We chose to use qualitative research methodology to explore a range of concepts, themes, and considerations surrounding pregnant women's experiences, including emotional and psychological experiences, during the first four months of the COVID-19 pandemic. In-depth phone interviews with pregnant and recently pregnant participants were performed by a research coordinator to assess a broad range of social, emotional, psychological, and healthcare experiences of pregnancy, birth, and postpartum care during the COVID-19 pandemic. Verbal informed consent was obtained from all participants prior to interviews. All interviews were conducted in English.

A research coordinator used a semi-structured interview guide and asked participants a broad range of questions about their experiences of pregnancy, birth, and the postpartum period during the COVID-19 pandemic, including questions about their pregnancy history, COVID-19 status and history, physical health and healthcare experiences, and emotional and psychological health. In addition, participants were asked about the psychosocial impact of the COVID-19 on their daily life, emotional support systems, emotional experiences of social distancing and quarantine, household stress, general emotional and psychological health, and coping strategies during the pandemic (**Figure 1**). At the end of the interview, participants provided information about sociodemographic and reproductive characteristics, including age, race and ethnicity, gravidity and parity, insurance status, employment status, educational attainment, and marital

status. All phone interviews were audio recorded, transcribed, and uploaded into NVivo 12 software for thematic analysis

2.3 Data Analysis:

For this paper, I only analyzed data from interview transcripts pertaining to participants' psychological and emotional experiences of COVID-19. A research coordinator and I worked to develop codes a priori from the qualitative interview guide and used NVivo software to code transcripts. The coding process was iterative in nature and new codes were added throughout. Using display matrices, I identified emergent, overarching themes related to participants' expressed feelings and self-described emotional states. These themes included risk, protection, and change. For each theme, I selected representative quotes, which are displayed below by pseudonym, race/ethnicity, pregnancy trimester, and COVID status.

3. Results

3.1 Participant Sociodemographic Characteristics and COVID History:

The final sample for this analysis consisted of 20 pregnant or recently pregnant participants from Massachusetts General Hospital clinical sites. Participants ages ranged from 28 to 49 years (mean age = 35.6 years). In terms of race and ethnicity, 65% (n=13) were non-Hispanic White, 20% (n=4) were non-Hispanic Black, and 15% (n=3) were Hispanic/Latinx (**Table 1**). At the time of their interviews, 35% (n=7) of participants were in the second trimester, 30% (n=6) were in the third trimester and 30% (n=6) were postpartum; 60 percent (n=12) of participants were multigravidas. Most participants 75% (n=15) were employed, 65% (n=13) had a college degree or higher, 80% (n=16) were privately insured, and 80% (n=16) were

married. At the time of the interview, 55% (n=11) were COVID positive, 15% (n=3) were "persons under investigation" (PUI) who tested negative, and 30% (n=6) were PUI who were either not tested or had an unknown test result (**Table 2**).

3.2 Self-described Emotions Among Participants

Table 3 shows the number of participants who expressed specific emotions on at least once. The most common negative emotions reported by participants were anxiety (90%), uncertainty (80%), fear (70%), sadness (60%), and disappointment (55%). Among the positive emotions described by participants, the most frequently reported were relief (65%), trust (55%), and acceptance (35%) (**Table 3**).

3.3 Crosscutting Themes:

Three intersecting, cross-cutting themes were identified related to participants emotional reactions and experiences surrounding COVID-19: risk, protection, and change. Both pregnancy and COVID-19 have unique contexts of risk, protection, and change. In the context of this study, there are myriad intersections between these themes, which highlights the compounding emotional effects of pregnancy and the COVID-19 pandemic. The intersecting themes of risk, protection, and changed are discussed in greater detail below with representative quotes and pseudonyms.

Risk

Participants described a range of emotional reactions to the various risks associated with pregnancy and COVID-19. Many respondents acknowledged that pregnancy and COVID-19

represented a time of risk. Participants discussed the ways in which the pandemic compounded the sense of risk and exacerbated emotional responses to risk and stress. Overwhelmingly, participants expressed fear and anxiety related to the health risks associated with COVID-19 disease in pregnancy:

> *"The baby depends on you to be healthy… If I don't get oxygen, the baby's not going to get enough oxygen... That was very frightening."*
> *-Brianna, Black, 3rd Trimester, COVID Positive*

Many respondents also felt anxiety about the risk of fetal anomalies. While some described how hearing the fetal heartbeat at prenatal appointments provided a sense of emotional relief, others felt persistently worried. For some, the anatomy scan was associated with worry about fetal anomalies:

> *"It created some sense of anxiety for me, just because… not that I thought that I would… that it would have shown any abnormalities from me having COVID, but it just made me… like I was excited to be able to have… when I tested positive I just felt like 'alright well the anatomy scan will reassure me than everything is okay with the baby… it just… it just made me a little more nervous as far as knowing that everything's okay."*
> *- Jane, White, 2nd Trimester, COVID Positive*

While some respondents worried about the immediate risk of fetal anomalies, others articulated a sense of worry and anxiety about the long-term risks from COVID-19 infection on their child's health outcomes:

> *"In ten years, are they going to diagnose my child with something that has some sort of connection with me being pregnant with COVID?... Like developmental delays?... I'm definitely scared that like at some point—ten years from now—they're going to be like 'oh your child has this,' and it's going to be like a whole wave of them, and it's going to be, 'oh everyone that was pregnant during covid and who was positive for covid, like all of these kids have this.'"*
> *-Charlotte, White, 3rd Trimester, COVID Positive*

Although many participants expressed fears about specific risks, others felt that many of the risks of COVID in pregnancy were unknown. This uncertainty contributed significantly to feelings of anxiety:

> *"It's brought a lot of anxiety with it, just because there was so much unknown… It was like a roller coaster of emotions… When I was first—when I first got the positive test results back, I was so nervous about my daughter getting the virus, now that I knew I had it. And I was nervous about the baby being born into this world, not knowing if she was getting antibodies from me or how she would be impacted in utero before she was born. There was a lot of emotion, because so much was unknown."*
> *-Larissa, White, Postpartum, COVID Positive*

Some participants also focused on the lack of data surrounding the risk to the fetus, which heightened their sense of anxiety and stress:

> *"It's been an anxious time. There are too many unknowns right now about how this will affect my baby even though how this will affect my baby even though I had minimal symptoms… There's just not enough data out there."*
> *-Jane, White, 2nd Trimester, COVID Positive*

Participants with a history of pregnancy loss expressed a unique sense of worry and angst about the immediate risks of COVID-19 harming the fetus and contributing to subsequent pregnancy loss:

> *"I had an intrauterine fetal demise at 23 weeks… I've just had added anxiety just with this pregnancy in general, but coronavirus has just been another obstacle in terms of just making sure that I'm keeping myself healthy… Then actually getting coronavirus –I focused on recovering and taking care of myself so that the babies were okay."*
> *-Keisha, Black, 2nd Trimester, COVID Positive*

Others voiced anxiety surrounding the risk of obstetric-related complications from COVID-19, including preterm labor:

> *"I still worry—maybe I could go into labor early because I've seen on the news that a lot of people are dying, and they go into labor early."*
> *-Jocelyn, Latina, 3rd Trimester, COVID Positive*

While some participants focused on the fetal and pregnancy-related risks, others expressed fear for their own health, including the risk of death from COVID-19.

> *"I was really worried because people die from this, you know. So, I really was worried about it. I was scared. I remember the night I said, "Oh my god am I going to die?"*
> *-Brianna, Black, 3rd Trimester, COVID Positive*

Several COVID+ participants also endorsed anxiety about the risk of transmitting to their loved ones, including their children, in their homes.

> *"You don't want to be around the kids but yet you have to be. And then if your husband doesn't know how to cook, you have to cook… You get anxious… am I infecting the food? Am I infecting the kids? There's only one bathroom in the house. What do I do? It's really nerve-wracking."*
> *-Selina, Latina, Postpartum, COVID Positive*

More broadly, for many participants, making decisions about risk—weighing the risks and benefits of each action—throughout the pandemic was associated with a variety of emotions. One participant described the decision-making and evaluating risk heightened her sense of uncertainty and anxiety as a new mother:

> *"I felt uncertain and unsure about whether I was making the right decisions. I tried to use all the resources available to me and understand as much as I could about the pandemic, but there is no clear guide to what to do as a person in this time, and as a parent in this time. So, I definitely felt more anxious around the decision-making, but we wanted to be better safe than sorry, wanted to be cautious as possible, but it definitely You know, brought up a lot of kind of uncertainty as a new mom. Am I, am I doing the right things? Am I making the right decisions and, you know, what am I giving up on the other side in terms of relationships with family?"*
> *-Sophia, White, Postpartum, PUI not tested*

Some participants discussed the difficulty of making decisions related to risk during a time in which information sources were confusing or unreliable, voicing feelings of mistrust and uncertainty:

> "*It was really hard for me to trust anything because of the media… Whenever I had a free minute, I was reading about the coronavirus or watching something about the coronavirus, you know, and there was a lot of misinformation and there was a lot of going back and forth with, you know, opinions and opinions from people, from scientists, opinions from doctors that—that that conflicted with each other… It was every day it was something new or they took back what they said the day before… My trust and confidence definitely started to dissipate after a little while."*
> *-Amelia, White, Postpartum, COVID Positive*

Other participants discussed the constant worry surrounding the risk of exposure and the uncertainty related to other people's social distancing behaviors:

> *"I have to get my mom to stay with [my daughter]. My mom likes to go to a friend's house for the pool... it's like okay she's going to the pool, have those people quarantining? Have those people been cleaning? There's anybody in their family or have anyone they've been around had the COVID? It's like—it's just your mind's constantly going now, because I don't know what can happen. Like, obviously my daughter got I tested also due to the baby. She was negative, but could her possibly going to the pool get her infected? That constant worry."*
> *-Selina, Latina, Postpartum, COVID Positive*

While some participants articulated anxiety related to COVID-19 and pregnancy related risks, others discussed broader risks from the pandemic. Several participants described uncertainty and anxiety surrounding financial and economic risks:

> *"My company did widespread layoffs while I was on maternity leave, as a result of coronavirus. And also has like salary increases for the foreseeable future. And so that was a nerve-wracking period during the layoffs and then even since as I think about like our future finances."*
> *-Sophia, White, Postpartum, PUI Not Tested*

Protection

Another emergent theme was protection. Notions of protection were raised in a variety of contexts, including an internal impulse of protection as well as external experiences of protection from healthcare workers and systems. Overwhelmingly, participants voiced their internal desire to protect their babies, families, healthcare staff and others from the disease. Many participants took extreme measures, including cleaning surfaces vigorously, quarantining and wearing masks around their loved ones, to protect them from COVID-19 infection:

> *"I realized 10 days in that that I actually hadn't kissed my son. It's just because I always had a mask on, and it was always being very careful to make sure I was protecting him… It was hard."*
> *-Kayla, White, Postpartum, COVID Positive*

These protection-related behaviors were associated with a range of emotions among participants. One respondent who was COVID positive described frustration and guilt after contracting COVID and not being able to protect her baby from the infection:

> *"How did I let this happen to myself and to the baby? I felt very guilty, I felt like I did something wrong, and maybe I shouldn't've gone food shopping that day that I did… It was very mentally and emotionally draining because I felt a lot of guilt. I felt like I was supposed to protect myself and the baby. And I really thought that I did everything to do that. And then it kind of fell into the 'why me' like, why does this have to happen to me? I made sure to go to stores during pregnancy hours, I made sure to wash my hands and wear a mask, and when I got into the car wiped everything down, I took all the precautions… I'm following all the rules, and then someone else there didn't follow the rules, and now I have it and my baby's in trouble."*
> *-Charlotte, White, 3rd Trimester, COVID Positive*

Although contracting COVID-19 represented a lack of fetal protection for some participants, others felt that the infection was a form of protection. One COVID positive participant described positive emotions, including feelings of gratitude and comfort, knowing that her antibodies may be transmitted to the baby and would protect them from COVID in the future:

> *"I feel lucky in a way because I was sick already. I feel like I'm protected to an extent, so, hopefully the antibodies, and hopefully my child will also have antibodies and will not get sick even if exposed, so in a weird way, it comforts me that I was sick, and I feel bad for the moms that are about to go in without being sick and without previous exposure because I feel like they must be very anxious about being there and about the baby possibly getting sick."*
> *-Isabella, White, 3rd Trimester, COVID Positive*

While some respondents described protection in the context of the fetus, others discussed their heightened anxiety about protecting other loved ones from becoming infected after they received news of their COVID positive test:

> *"I started to worry about, not just myself and the baby, but then all of my friends and family, who I hadn't seen very often, but we had done some backyard visits and I started to worry that I could possibly have given coronavirus to someone else."*
> *-Kayla, White, Postpartum, COVID Positive*

Other respondents talked about protecting the emotional wellbeing of their loved ones, including their children and husbands. Some participants who were COVID positive specifically talked about their desire to protect healthcare professionals from becoming infected, citing anxiety and guilt, among other emotions:

> *"I also had a lot of anxiety around exposing people to me. I had a lot of guilt around that and was nervous about going into the emergency room and seeing all the doctors and nurses who were staying healthy taking care of other people. I was anxious about them getting sick because of me."*
> *-Larissa, White, Postpartum, COVID Positive*

While some participants voiced their internal drive to protect others, others described the external experience of protection, specifically surrounding physicians and healthcare facilities. For some, protection meant their healthcare team frequently monitored the safety of the pregnancy or COVID symptoms through phone outreach. One respondent described feelings of relief and support from this frequent communication assessing COVID symptoms:

> "*My OB office and my PCP office, they were calling me like every day checking in… They made me feel confident… When I was at the 7-day, 8-day mark and my symptoms weren't getting worse, I was like, 'okay this is going to be the worst of it, I'm going to be fine.'"*
> *-Charlotte, White, 3rd Trimester, COVID Positive*

Another participant who received frequent phone calls from her prenatal care clinic after testing positive for COVID discussed the emotional impact of the increased communication:

> *"It makes you feel like somebody cares. [It] feels like, "Okay, I'm with you. I just can't see you, but I'm with you."*
> *-Brianna, Black, 3rd Trimester, COVID Positive*

Other participants described feeling protected by their physicians. Many focused on the ways in which relationships created more trust, comfort, and relief:

> *"I love my doctor… he's the best… I was already comfortable with him. I trust him… We have a good relationship and so that I was confident that if anything was wrong, or you know, I would tell him, and he would, he would help me or do whatever I needed him to do, you know, so it was okay."*
> *-Amelia, White, Postpartum, COVID Positive*

Protection was also evoked in the context of infection control measures from healthcare facilities, including screening for symptoms, testing, mandatory mask requirements, limits on visitors, and neonatal separation policies for women who tested positive, among other measures.

For some, these measures were associated with positive emotions, including acceptance, trust, and reassurance, expressing that they felt "pleasantly surprised," "happy," "safe" or "lucky". While some participants endorsed positive emotions, others reported negative emotional experiences. One participant voiced feelings of disappointment after not being able to do skin skin-to-skin with her infant. One respondent described the devastating emotional impact of the protective measures:

> *"On delivery day, I was totally just beside myself. I was devastated because they were telling me I can't do skin to skin with the baby, that I have to wear a mask if I want to breastfeed him, the bassinet has to be six feet away from my bed, and I was just devastated. I was really upset. I was crying. I was hysterical because I just, you know, like I said to that that first time that you hold the baby, it's like—it's just the best thing in the whole world. When they came in and told me like I said that I was positive for the coronavirus I was totally devastated… I just felt like—I felt like my—my rights were being violated. You know, I felt like they couldn't tell me that I couldn't hold my own kid, you know. I was angry. I was upset. I was hurt. I was sad… It was really hard."*
> *-Amelia, White, Postpartum, COVID Positive*

Change

Another salient theme was change. Participants described change in a variety of contexts, including changed experiences of prenatal care, birth, and postpartum care, as well as broader changes in social structures and daily routines. The ways in which participants responded emotionally to change were varied and complex. Many respondents indicated that they had certain expectations for experiences of pregnancy and birth. These experiences were significantly altered—fundamentally changed—by the pandemic. Several participants articulated their emotional responses to many of the health system changes that occurred during the initial months of the pandemic, such as changes related to prenatal care appointments, neonatal separation policies, and infection control policies, including policies limiting support personnel or requiring laboring women to wear masks. For many participants, these changes in typical prenatal care and

birthing experiences were associated with anxiety and uncertainty. Furthermore, participants who had changes in prenatal care schedules, either with less frequent or telemedicine visits, voiced heightened anxiety. One respondent with a history of pregnancy loss expressed frustration and anxiety from the changes in her prenatal care appointment schedule:

> *"It's really frustrating and caused me extreme anxiety… I had two miscarriages. And both during the first trimester, and one I didn't know that there was no heartbeat. And I didn't have a doctor's appointment for a while. So, this [appointment] was to make sure that I didn't miscarry."*
> *-Madison, White, 1st Trimester, PUI Not Tested*

Others expressed a range of emotions surrounding changed experiences at their appointments. For some, the infection control policies limited support personnel at appointments. One participant discussed the emotional impact of not having her husband and children at her ultrasound appointments:

> *"I would love to take my girls so they can see the baby. I hate that. And I hate that my husband, he can't go in with me. I have to go by myself. I hate that, I would like for us to go as a family… It's sad that I have to be there by myself. I would like to experience that happiness with my family. They're so excited about it and they can't see the baby on the ultrasound; it makes me sad."*
> *-Viola, Black, 2nd Trimester, PUI COVID Negative*

While some respondents felt sadness and grief related to the changed appointment experiences due to infection control policies, others voiced acceptance and understanding.

> *"I think it's like a really special moment for my kids to meet their sibling, but it's just hard, not being able to. I understand it's because of the virus and I want to keep them safe."*
> *-Jocelyn, Latina, 3rd Trimester, COVID Positive*

Somme participants described negative emotions from the changes in prenatal care, birthing and postpartum experiences. However, others endorsed positive emotions in the midst of these new and unforeseen changes. One participant responded to the changes with gratitude:

> *"I feel like labor and the c-section were so traumatic enough and not to be able to be close to my daughter for a little bit was even more traumatic… but I'm just so happy that*

I have a healthy daughter, that I, that's all I think about…I'm just so happy she was healthy. That's all I really cared about. I know this whole thing for me was not the way I envisioned everything would go but I try to focus on the positive side of things and all I cared about was a having a healthy baby and I got it so, I always, I'm very grateful for that."
-Christine, White, Postpartum, PUI COVID Negative

One participant talked about how frequent phone communication and outreach from her obstetrician's office improved her emotional experience, voicing feelings of acceptance and relief:

"I felt that with them calling me as much as I did within that time period also helped… The OB office would say 'do you feel the baby' Yes. 'Do you have any bleeding?' No. 'Do you have any contractions?' No. And they'd be like, 'okay, we'll call you back in a couple of days.' So, them asking me those questions and me being able to answer them confidently, made me definitely able to feel better about not going in for any appointments."
-Charlotte, White, 3rd Trimester, COVID Positive

In addition to discussions surrounding the changes in healthcare experiences, many participants discussed how the pandemic has broadly transformed social experiences of pregnancy and birth.

"*Coronavirus has changed everything. We're not able to have a baby shower, which we were hoping to have in June… We're having twins…my baby shower would have supplied everything."*
- Keisha, Black, 2nd Trimester, COVID Positive

Some participants described having to cancel their baby shower as emotionally "upsetting" and "disappointing." Others expressed grief about not being able to show their baby bump or take pictures with colleagues, friends, and family. Many respondents vocalized a sense of grief and sadness associated with these changed social experiences of pregnancy during the pandemic. One participant described feelings of grief concerning her changed plans:

"I felt sad, I felt like I was mourning the loss of that time and the plan that we made. It felt a little bit like we got robbed of the experience that we hoped to have with a new baby, particularly in relation to our families."
-Sophia, White, Postpartum, PUI Not Tested

Many respondents also described the changes in social structures as a "lonely" and "depressing" time, expressing sadness resulting from these disrupted support networks:

> *"I'm sad because I want our daughter's grandparents to see her and be around her."*
> *-Christine, White, Postpartum, PUI COVID Negative*

While some participants reacted to the changes with sadness and grief, others expressed feelings of guilt for not being able to provide their children with normal and expected experiences:

> *"My daughter, my oldest was going to school. And, you know, then she had to stop going to school, not because—not because I was positive, but because they closed everything… I still feel guilty now for my kids because I feel like they're missing out on a lot of experiences that they really need to experience. And so, there is a lot of "mom guilt", you know? I think that's the been the main thing that's affecting me now, is just the guilt that I feel for my children. Not even for myself… it's really sad with everything they have to go through."*
> *-Amelia, White, Postpartum, COVID Positive*

Some participants also talked about how the changes in daily routines, including exercise and work habits, adversely affected their emotional and mental health.

> *"It was really depressing… I felt like I was selecting jail or something. I never been in jail, but it's like being inside your room for so long it gets really depressing."*
> *-Jocelyn, Latina, 3rd Trimester, COVID Positive*

While some participants labeled the vast changes in the quarantine lifestyle as a "depressing" or generally negative emotional experience, others described positive experiences. One participant reported feeling more relaxed because of the changes from the pandemic, including being able to work from home:

> *"I kind of like it because I get to stay home… I get to spend time with my other children more often…I don't feel like I'm running on a treadmill 24/7. I'm excited because I get to stay home with my kids…I haven't felt sad or any of that stuff, because you know, I'm home and I can relax."*
> *-Viola, Black, 2nd Trimester, PUI COVID Negative*

Another participant also endorsed positive emotions resulting from the changes. In particular, she described feelings of gratitude for the time with her newborn:

> *"I will say that I'm almost grateful for having had to be stuck at home, leading up to having this baby because I was, you know, happy to have a lot of one-on-one time with our firstborn before this one came along. I feel like I cherish those times, that we really got a lot of time together before the new one came along."*
> *-Larissa, White, Postpartum, COVID Positive*

Overall, participants voiced mixed and complex emotional responses to the healthcare and broader social changes from the pandemic.

4. Discussion

Among this sample of well-resourced pregnant and postpartum participants with either suspected or confirmed COVID-19 infection, the majority reported feelings of anxiety, uncertainty, fear, and relief, which reflects the pervasive sense of threat,[43] danger, crisis felt by pregnant women during the initial months of the pandemic, especially among patients who tested positive for COVID. These findings are consistent with existing literature showing the most common emotions reported by pregnant people during the COVID-19 pandemic are fear, anxiety,[30] and depression.[44]

These findings illuminate the ways in which emotions surrounding risk, protection, and change intersect with both pregnancy and COVID-19. The most frequently voiced emotions related to risk were fear, anxiety, and uncertainty. The notion of risk in pregnancy often is evoked in a context of decision making the risks to the woman and fetus of a medical intervention,[45] but its significance is broader here, as participants articulated mixed emotional responses surrounding not only pregnancy-specific, but also pandemic-related health, social, and economic risks. These data reveal that a heightened sense of risk from the pandemic may compound the emotional responses, particularly the sense of anxiety, surrounding pregnancy-related risks, and vice versa. Unclear or poor communication surrounding risks of COVID

infection in pregnancy may have contributed to worse emotional experiences, including mistrust and uncertainty, during the pandemic. Throughout the pandemic, misinformation related to risks have been both underexaggerated and overestimated.[46] Timely and clear public health messaging about risks for pregnant people may be crucial to combat misinformation[47] and alleviate emotional stress in future crises.

The uncertainty surrounding risks in pregnancy is not specific to COVID, as pregnant people have been historically excluded from clinical trials addressing other health conditions.[48] Indeed, many participants in our study discussed the ways in which "the unknown risks" were a major source of anxiety and emotional distress, which is consistent with previous literature.[30] One qualitative study assessing non-infected women in Turkey during the COVID-19 pandemic found that a broad "fear of the unknown" contributed to worry among participants.[30] My findings add the perspective of COVID positive pregnant people to this context and show that "fear of the unknown" represents both a generalized uncertainty about the future as well as specific fear about the unknown immediate or long-term risks to the fetus. Furthermore, these findings underscore the need for rigorous research, surveillance, and data dissemination to provide pregnant people with evidence-based information on the risks associated with COVID-19 in pregnancy.

In addition to risk, participants expressed a range of emotions related to their experiences of protection. Participants expressed their desire to operate as agents of protection, keeping not only their babies, but also their families and healthcare workers safe. While notions of protection in pregnancy are typically discussed in contexts of maternal protective behaviors and antenatal attachment to the fetus,[49] these data highlight a more nuanced and complex understanding of

pregnancy people's protective impulses and emotions. These data expand notions of pregnant people's protective impulses, revealing their altruism amid the global crisis of the pandemic.

These findings also suggest that trusting relationships with healthcare providers are central to pregnant people's positive emotional experiences with protection, which is consistent with other literature showing that pregnant people who had frequent contact with providers during the pandemic had lower stress and felt more comfortable,[30,50] and had lower rates of postpartum depression.[37] Certain protective measures, such as screening, were emotionally comforting to participants, while others, particularly infection control policies, had devastating emotional impact on emotional experiences of pregnancy and birth. These findings are also consistent with emergent literature on protective measures, such as neonatal separation policies.[51] One qualitative study found that 75% of COVID positive women who gave birth reported negative experiences with neonatal separation after birth.[51] My findings add to this literature and highlight important emotional subtleties, underscoring the ways in which many protection measures, even if well-intentioned, were not congruent with the priorities of pregnant people and may have caused emotional and psychological harm.

As participants discussed the ways in which protective pandemic measures altered experiences of pregnancy and birth, change emerged as a particularly salient theme. Pregnancy is already a time of transformation, and the pandemic has been filled with unprecedented social and economic change. The two intersecting experiences of pregnancy and COVID may have compounded emotional responses to change. To many respondents, the changed healthcare and social experiences of pregnancy, birth, and parenthood in the context of COVID-19, represented a loss, as they voiced emotional experiences of grief, sadness, and guilt. These emotions are not unique to the COVID-pregnancy context, as many women have previously reported

disappointment and grief when births do not go as planned.[52] Research has suggested that women's positive or negative framing of their birth narratives are more related to control and autonomy than to the actual events of the birth.[52] Thus, promoting pregnant and birthing people's choice—optimizing their control when possible— may be an important approach for clinicians to help mitigate the emotional effects of altered pregnancy and birthing experiences in the pandemic.

While the changed experiences of pregnancy during the pandemic represented a loss to some participants, others viewed the changes through a lens of gratitude and acceptance, which are both adaptive coping skills for adversity.[53] Although transitions in life can represent a vulnerable time, they can also be a time of growth and connection. Our data reveal that many participants approached pandemic-associated social changes with a psychological flexibility and adaptability, embracing the positive aspects of the change.

4.1 Limitations

This study has several limitations. First, the sampled population was predominantly white and affluent. These findings may not reflect the unique emotional stressors and lived psycho-social experiences of all pregnant people in the U.S., particularly those experiencing economic vulnerability or from marginalized racial and ethnic backgrounds. Future studies should explore the lived emotional experiences of socioeconomically diverse populations of pregnant women, given that financial stress from COVID has been associated with higher rates of perinatal depression.[54] Second, these data were collected during the first four months of the pandemic. At that time, the sense of risk regarding COVID-19 in pregnancy was more unknown and COVID-19 vaccines were not available. In a post-vaccine era with more available data on COVID in

pregnancy, pregnant people may have new and distinct concerns related to risk. Third, our sample was geographically limited to Massachusetts, which was a COVID-19 hotspot at the time these data were collected. Future studies assessing the emotional experiences of pregnant people from different regions of the United States, including areas with different social distancing requirements, may raise different considerations.

4.2 Conclusions

Ultimately, these data reveal the extensive emotional impact of the COVID-19 pandemic on pregnant people. While many participants responded to risk, protection, and change with positive emotions, others endorsed very negative emotional experiences, which underscores the importance of increased psycho-social support and screening for postpartum depression in during the pandemic.[55] Even in the absence of full psychiatric symptomology psychopathology, pregnant and recently pregnant people may benefit from increased psycho-social support, therapy, or counseling to help them process their experiences of the pandemic. Policies should aim to improve access to mental health to support the emotional needs of pregnant and recently pregnant people.

These findings also highlight the complex emotional reactions to various infection control policies and practices from the early pandemic, including infant separation practices and partner support. Although they were well-intentioned, many of these policies had a devastating emotional impact on many women. A better understanding of pregnant people's perspectives and emotional experiences may lead to clinical practices and institutional policies in future pandemics that are more supportive of pregnant people's needs and congruent with their values.

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Tables and Figures

Figure 1. Interview Questions on Psycho-social and Emotional Impact of COVID-19

1. ***Daily life:*** *Can you tell me about how coronavirus has impacted your day-to-day life?*
2. ***Support system:*** *Who would you describe as your regular support system? Probe: How has coronavirus influenced these relationships? Do you think coronavirus has changed how often you talk to these people? Has it changed what you talk about? In general, how concerned would you say people in your support system are about COVID-19?*
3. ***Social distancing:*** *Can you tell me what it was like to be socially distanced from people [or for COVID+ women: in quarantine] while you were pregnant? Probe: how has this impacted your closest relationships? Probe: partner, family, close friends? Would you say you have been able to maintain some connections? If so, how? IF POSTPARTUM: Is this any different after pregnancy?*
4. ***Household stress:*** *Have you experienced increased stress in your house? Probe: Do you feel safe where you live? Have you felt unsafe in any way because your partner is unable to handle the stress? Has anyone in your household hurt, kicked, punched, shoved or threatened you recently or in the past?*
5. ***General emotional health:*** *How has your emotional well-being, or your feelings, changed? Probes: anxiety, sadness, depression, uncertainty about the future, changes in access to mental health care?*
6. ***Coping skills:*** *How have you personally coped/dealt with coronavirus?*

Table 1. Sociodemographic Characteristics of Participants

Characteristics	***n***	**%**
Age	Mean (+/-SD)	35.6 (+/-5)
25-34	10	50%
35-44	9	45%
45+	1	5%
Pregnancy Trimester		
1st Trimester	1	5%
2nd Trimester	7	35%
3rd Trimester	6	30%
Postpartum	6	30%
Gravidity		
Primigravida	8	40%
Multigravida	12	60%
Race/Ethnicity		
Non-Hispanic White	13	65%
Non-Hispanic Black	4	20%
Hispanic/Latinx	3	15%
Education Level		
High School/GED	5	25%
Associate's Degree	2	10%
Bachelor's Degree	8	40%
Master's Degree or Higher	5	25%
Employment Status		
>1 Full or Part Time Job	2	10%
1 Full or Part Time Job	13	65%
Unemployed	5	25%
Insurance Status		
Private	16	80%
Medicaid	4	20%
Marital Status		
Married	16	80%
Unmarried	4	20%

Table 2. COVID-19 Testing and Symptom History of Participants

COVID-19 History	***n***	**%**
Test Status		
PUI Tested Positive	11	55%
PUI Tested Negative	3	15%
PUI Not Tested/Unknown Test Result	6	30%
Symptoms		
Severe	6	30%
Moderate	3	15%
Mild	8	40%
None/Asymptomatic	3	15%

Table 3. Participants' Self-Described* Emotions During Pandemic

Emotion	***n***	**%**
Negative		
Guilt	7	35%
Fear	14	70%
Anxiety	18	90%
Depression	6	30%
Mistrust	10	50%
Disappointment	11	55%
Loneliness & Isolation	9	45%
Stress	11	55%
Uncertainty	16	80%
Frustration/Anger	9	45%
Overwhelmed	5	25%
Sadness	12	60%
Positive		
Hope/Optimism	6	30%
Calmness	3	15%
Trust	11	55%
Gratitude	8	4%
Relief	13	65%
Acceptance	7	35%

*Emotions reported at least once in response to any question from the interview

Appendix 1. Limited Systematic Review

1. Introduction

1.1 Background

The COVID-19 pandemic has been a time of extraordinary risk, isolation, fear, and uncertainty, which may have a unique effect on pregnant people. COVID-19 acquired during pregnancy is associated with an increased risk of both adverse perinatal outcomes and severe COVID-19 disease.[12,13] Given that adverse perinatal outcomes, regardless of the cause, are associated with poor emotional health in the postpartum period.[14] COVID-19 infection and any COVID-associated complication occurring during pregnancy or birth may negatively affect the emotional health and psychological wellbeing of pregnant and recently pregnant women.[15] Preliminary research has shown high levels of emotional distress and fear among pregnant women concerning their risk of COVID-19 infection.[16]

In non-pandemic times, pregnancy can be an emotionally vulnerable time for many and is associated with an increased risk of psychiatric conditions. Throughout the pandemic, public health guidelines and policies for infection control have disrupted healthcare access, economic systems, daily routines, and social support structures. These fundamental changes caused by the pandemic may have a unique effect on pregnant and recently pregnant people, given the importance of strong social support and routine healthcare access during pregnancy. Thus, these broader social disruptions from the pandemic, in addition to the medical risks, may have had particularly detrimental effects on pregnant people's mental health and emotional wellbeing.

Some studies have shown a rising incidence of perinatal mood disorders, including postpartum depression and anxiety, throughout the COVID-19 pandemic.[36,38]However, the

broader psycho-social and emotional impact on pregnant people in during the COVID-19 pandemic is unclear.

1.2 Objective

To address this gap in the literature, I performed a systematic review of the evidence to identify cohort and cross-sectional studies using mixed or qualitative methodology to assess the self-described emotions and emotional experiences of pregnant and recently pregnant people. My primary objective was to critically appraise the evidence to address the following key question: What are the self-described emotions of pregnant and recently pregnant individuals during the COVID-19 pandemic?

2. Methods

I followed Preferred Reporting Items for Systematic reviews and Meta-Analyses PRISMA) guidelines for this systematic review.[56]

2.1 Scope of Review

In this review, I sought to generate a descriptive analysis of self-described emotions and emotional experiences of pregnant or recently pregnant people during the COVID-19 pandemic.

2.2 Eligibility Criteria

Eligibility criteria were determined a priori (**Table 1).** Eligible studies included those enrolling pregnant or recently pregnant (within 6 months) adults ≥18 years. Non-pregnant adults or pregnant adults < 18 years of age were excluded. Eligible studies had to measure self-

described emotions or emotional experiences. Studies reporting outcomes not related to the primary outcome of interest were excluded, including studies that assessed other pregnancy outcomes, including perinatal mood disorders or obstetric complications. Eligible study designs included cohort and cross-sectional studies that employed qualitative methods to assess the primary outcome of interest (reported emotions). This review limited to studies published after March 2020 since The World Health Organization declared COVID-19 a global pandemic on March 11, 2020.[57] Given the seismic global impact of the COVID-19 pandemic, this review included English studies that were conducted outside the United States. All non-English studies were excluded from this review.

2.3 Information Sources and Search Strategy

PubMed and PsycInfo electronic databases, as well as ClinicalTrials.gov, were through June 22, 2021 to identify relevant studies. The searches were developed in collaboration with a UNC health sciences librarian. The full search strategy is described in greater detail in **Table 2**. Based on a priori inclusion criteria limiting to experiences during the COVID-19 pandemic, searches were filtered to only include studies published after 2020.

2.4 Study Selection and Data Extraction Process

After identifying all records from databases and literature searches and removing duplicates, I screened titles and abstracts against study eligibility and inclusion criteria. Those marked as potentially eligible were reviewed again using the full-text articles. For studies meeting full inclusion criteria, I performed data extraction manually, including information about the study setting, aims, sample population, methods and study design, and outcomes (**Table 3**). I

extracted all outcomes from thematic or content analysis, including emergent themes and subthemes pertaining to reported emotions and broader emotional experiences during the COVID-19 pandemic among peripartum women.

2.5 Individual Study Risk of Bias Assessment

I performed the risk of bias assessment for the studies that met inclusion criteria using the Mays & Pope criteria[58], which is an established method for assessing qualitative research. The Mays & Pope criteria specifically examines the following domains of qualitative studies: 1) the importance and relevance of the study; 2) the clarity of the research question; 3) the appropriateness of the methodological design to the research question; 4) the research setting and context; 5) the sampling strategy; 6) the data collection and analysis procedures; and 7) reflexivity of the research, which includes if the authors provide information on whether qualitative analytical criteria were met in the study. The studies were rated as high, medium, and low risk of bias. I did not exclude studies from my review based on quality or risk of bias.

2.6 Data Synthesis Methods

The primary outcome assessed was self-described emotions, including described emotional experiences, during the COVID-19 pandemic. All studies were eligible for synthesis of the primary outcome of this review and the outcomes from each study were summarized.

3. Results

3.1 Study Selection

The PubMed search identified 130 publications, the PsycInfo search identified 3 publications, and the ClinicalTrials.Gov search identified 11 studies (**Table 2**). I identified a total of 144 unique studies that were conducted or published since 2020 from my database and literature search queries (**Figure 1**). Of those 144 unique studies, 36 were marked as relevant and were reviewed with abstract screening. Of the 36 studies, eight full-text articles were reviewed for eligibility. Reasons for full-text exclusion are shown in **Figure 1**. Four studies met inclusion criteria and were included in the final review.

3.2 Study Characteristics

Studies were published from 2020 to 2021. Three of the four studies were cross-sectional in design and one was a cohort study.[55] Two of the studies employed a mixed methods approach, using both quantitative methods to analyze survey data and qualitative methods to analyze interview transcripts.[51,59] Two of the studies used qualitative methods only to analyze focus groups[60] and interview transcripts.[30] Two of the studies were conducted in the United States (Pennsylvania and Colorado),[51,59] one was conducted in Turkey,[30] and one was conducted in India.[60] Among the four included studies, sample sizes ranged from 15 to 311 participants, and age ranged from 18-45 years, and the majority of participants were in the 25-34 age group across all four studies. Most (n=3) studies enrolled a majority of primigravida patients (43%-80%). Race and ethnicity were only reported in the U.S. studies and the percentage of white participants was 53%[51] and 85%.[59] In three studies, 100% of participants had no history of COVID-19 infection and in Bender et al., only 2.5% of participants had a history of COVID-19 infection.

3.3 Risk of Bias in Studies

The risk of bias for the four studies included in the final review ranged from medium to high; common methodological limitations included selection, measurement, and researcher bias (**Table 4**). According to the Mays and Pope Criteria (**Table 4**), all the four studies were adequate in worth and relevance, clarity of the research question, appropriateness of design and question. In the Bender et al. study, there was a high risk of bias overall. A major limitation of their study was that they qualitatively analyzed survey data, which limited their ability to further probe participant responses, contributing significantly to measurement bias. The Farewell et al. study had medium risk of bias overall. A major limitation of Farewell et al.'s study was selection bias, as the researchers utilized social media to recruit a convenience sample of participants. Kumari et al.'s cross-sectional study had a medium risk of bias. Their study was limited by a non-probabilistic sampling strategy, which led to a high risk of selection bias. Mizrak and Kabacki's study had a medium risk of bias overall and an importance limitation of their study was selection bias, as the researchers used a snowball sampling method.

Overall, the most common form of bias limiting the findings of the four studies was selection bias, which may limit the generalizability of the findings. Although qualitative studies generally have a smaller sample size compared to quantitative studies, selection bias can be introduced from convenience sampling if no thematic saturation is reached. Sampling bias across all four studies may limit the range of emotions represented in cumulative findings. The four studies also had a medium to high risk of measurement bias. All the studies conducted their measurements virtually, given the social distancing requirements of the pandemic. For studies that employ qualitative methodology, in-person semi-structured interviews and focus groups can improve data collection and quality and reduce measurement bias. However, in-person

measurement was not an option during the COVID-19 pandemic. The medium to high risk of measurement bias may impact the internal validity of the findings. All the four studies had a high risk of confounding bias, as they did not control for or perform any adjustments for confounding factors that may have also adversely affected stress and emotions during the COVID-19 pandemic.

3.4 Individual Results and Synthesis

The primary outcome assessed in this review is emotions and emotional experiences among pregnant and recently pregnant women during the COVID-19 pandemic. This review also assessed themes and subthemes surrounding emotional experiences of pregnancy, birth, and postpartum care during the pandemic (**Table 5**). Overall, fear and anxiety were the two emotions that were consistently reported across all four studies and loneliness was reported in three studies. There was heterogeneity in terms of other emotions reported across the four studies, which included uncertainty, depression, stress, guilt, suspicion, irritability, sadness, helplessness, hopelessness, boredom, comfort, relief, gratitude, and optimism (**Table 5**).

There was some consistency in terms of themes and subthemes surrounding emotional experiences of pregnancy, birth, and postpartum care during the pandemic. Across all four studies, fear surrounding the risk of infection and disrupted social networks resulting in isolation were consistent themes. Other themes ranged from not understanding the seriousness and fear of the unknown, disruptions in prenatal care, and disrupted routines and lives, difficulty with neonatal separation among COVID positive participants, fear surrounding the risk of infection and positive testing, difficulty from social isolation, coping strategies, resilience, and “silver linings” of COVID-19 pandemic (**Table 5**).

4. Discussion

Fear and anxiety surrounding the risk of COVID-19 infection and loneliness due to disrupted social structures were consistently reported emotional experiences across all four studies. The ability to draw a strong conclusion about the emotions and emotional experiences of pregnant and recently pregnant people during the COVID-19 pandemic is limited due to methodological limitations, including study design, sampling approach, and data analysis process, contributing to selection and measurement bias. The studies included in this review had a particularly high risk of selection bias, given that they all utilized a convenience sampling approach. In particular, the populations across the four studies were predominantly primigravidas aged 25-35 years who did not have COVID-19 infection, which may limit the generalizability of these findings to other pregnant populations, including adolescents and pregnant patients with COVID-19. Given that fear, anxiety, and other negative emotions were consistent across all four studies that sampled predominantly COVID-negative participants, pregnant patients with COVID-19 may be at an even higher risk for adverse emotional experiences.

4.1 Limitations

This review was limited by the fact that the selection process and eligibility criteria generated a very small number of studies to include. In addition, the timeframe of the studies included is an important limitation of this review. The studies included were published in March 2020- June 2021. The authors did not specify the exact timeframe when they collected their data, which has implications for the reported emotions. For example, studies that collected data from the spring of 2020 may reveal meaningful differences in reported emotions compared to studies

published in the spring of 2021, given the rapidly changing context of the pandemic and available vaccine.

Another limitation of this review is the quality of the available studies included. The four studies included were of poor quality, based on high concerns for selection, measurement, and researcher bias. Another limitation of this review is the heterogeneity of how the primary outcome (emotions) was measured and described. Last, an important limitation of this review is that there was only one reviewer (NCS) who performed the methods, including screening, data extraction, and risk of bias assessment.

4.2 Implications

Existing literature has shown elevated rates of perinatal mood disorders during the COVID-19 pandemic. This review highlights the range of emotions experienced by pregnant women during COVID-19, including fear, anxiety, and loneliness, that may contribute to perinatal mood disorders or other psychiatric symptomatology. Even in the absence of psychiatric symptomatology, pregnant people may need increased psycho-social and emotional support to process fear, anxiety, and loneliness, among other emotions. For future crises, clinicians and policymakers should consider proactive strategies to better support the emotional needs of pregnant patients.

It was beyond the scope of this review to characterize the prevalence of each emotion described by participants. Future studies should seek to recruit larger samples and employ rigorous quantitative methods to assess the prevalence of the reported emotions among pregnant populations with more analyses. Future randomized controlled trials could explore the effects of specific interventions on the emotions described and the mental health outcomes of pregnant

patients. Last, more longitudinal prospective cohort studies are needed to assess the long-term emotional effects and mental health outcomes of people who were pregnant during the COVID-19 pandemic.

Registration and Protocol: *there was no registration or protocol for this review*.

Funding: *There were no funding sources to disclose for this review*.

Competing Interests: *The lead author does not have any conflicts of interest to disclose*.

Availability of data, code, and other materials: *the lead author (NCS) has the data and materials used in this review.*

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Table 1. Inclusion and Exclusion Criteria for Studies

Inclusion Criteria	Exclusion Criteria
Population:	
• Pregnant or recently pregnant adults ≥18 years	• Non-pregnant adults; pregnant or recently pregnant persons < 18 years of age
Setting:	
• Studies conducted and published after March 2020	• Studies published before March 2020
Exposure	
• Pregnancy during the COVID-19 pandemic	
Outcomes*:*	
• Described emotions (including self-described emotional experiences and responses, distress, mood, feelings, emotional states, mental states, psycho-social functioning, psychological or emotional well-being, stress, coping strategies)	• All other outcomes, including perinatal psychiatric outcomes, pregnancy, and obstetric outcomes (rates of miscarriage, cesarean section, stillbirth), and other health outcomes
Study Designs:	
Studies published in English including: • Cross sectional-studies that included qualitative methodology to analyze survey, focus group, or interview transcripts • Cohort studies (both retrospective and prospective) that used qualitative methodology to analyze survey, focus group, or interview transcripts	Non-English studies including: • Case reports • Case-control studies • Cross-sectional studies that did not utilize qualitative methods • Cohort studies that did not utilize qualitative methods • Randomized controlled trials

Table 2. Search Strategy

Database	Search Strategy	Results
PubMed	("COVID-19"[Mesh] OR "COVID 19" OR "Disease, COVID-19 Virus" OR "Virus Disease, COVID-19" OR "COVID-19 Virus Infection" OR "COVID 19 Virus Infection" OR "COVID-19 Virus Infections" OR "Virus Infection, COVID-19" OR "2019-nCoV Infection" OR "2019 nCoV Infection" OR "2019-nCoV Infections" OR "Infection, 2019-nCoV" OR "Coronavirus Disease-19" OR "Coronavirus Disease 19" OR "2019 Novel Coronavirus Disease" OR "2019 Novel Coronavirus Infection" OR "2019-nCoV Disease" OR "2019 nCoV Disease" OR "2019-nCoV Diseases" OR "Disease, 2019-nCoV" OR "COVID19" OR "Coronavirus Disease 2019" OR "Disease 2019, Coronavirus" OR "SARS Coronavirus 2 Infection" OR "SARS-CoV-2 Infection" OR "Infection, SARS-CoV-2" OR "SARS CoV 2 Infection" OR "SARS-CoV-2 Infections" OR "COVID-19 Pandemic" OR "COVID 19 Pandemic" OR "COVID-19 Pandemics" OR "Pandemic, COVID-19") AND ("Pregnant Women"[Mesh] OR "Woman, Pregnant" OR "Women, Pregnant") AND ("Mental Health"[Mesh] OR "Emotions"[Mesh] OR "emotions[tw]" OR "psychological experience" OR "emotional experience OR emotion[tw] OR emotions[tw] OR fear[tw] OR grief[tw] OR disappointment[tw] OR gratitude[tw] OR distress[tw] OR isolation[tw] OR stress[tw])	**130**
PsycInfo	"COVID-19" AND "pregnant women" AND "emotions"	**3**
ClinicalTrials.gov	"Covid19" and "Pregnancy" and "mental health"	**11**

Figure 1. PRISMA Diagram

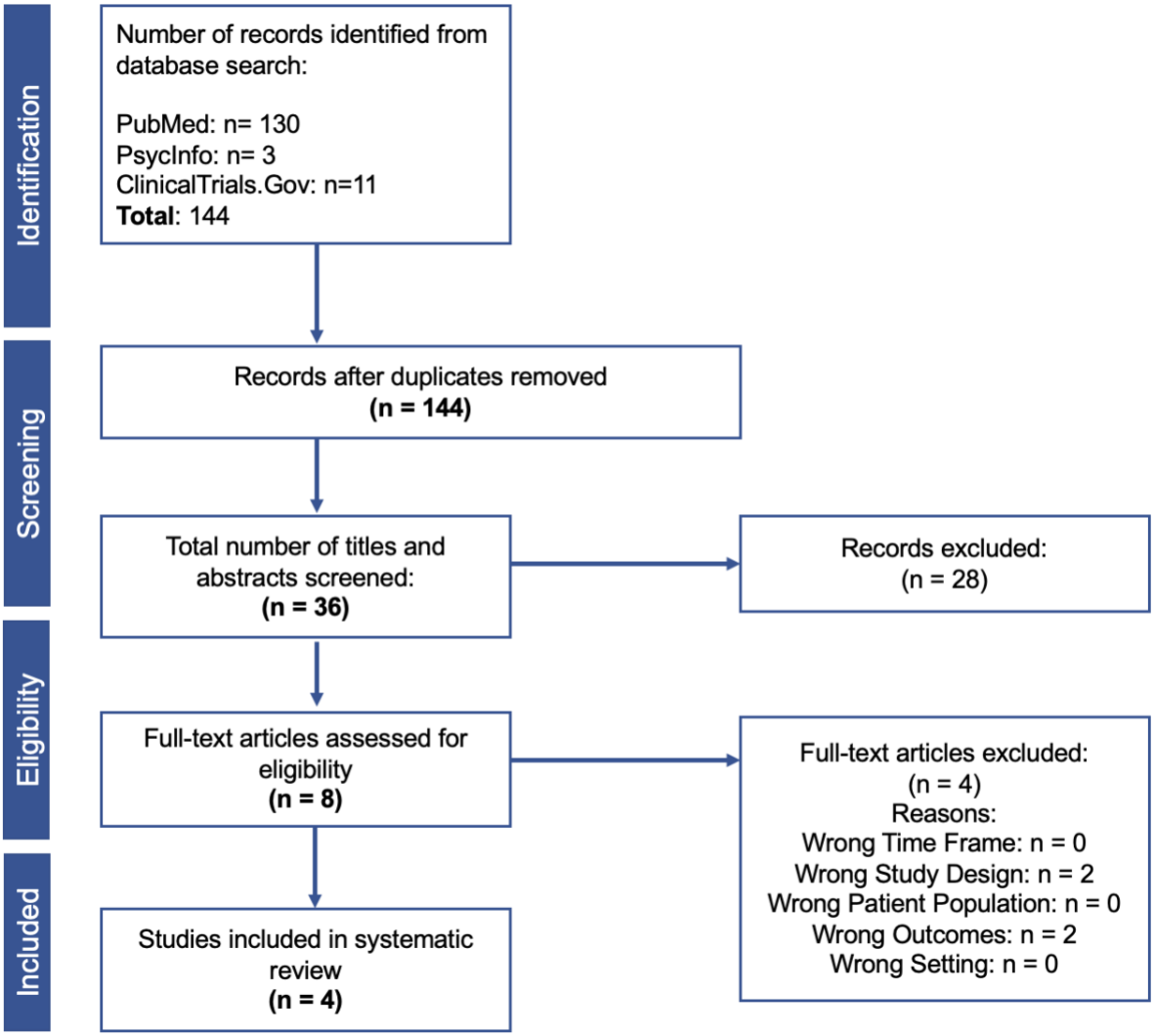

Table 3. Evidence Table of Included Studies

Study	Setting	Purpose	Sample	Methods / Study Design	Outcomes of Interest	Quality Ranking
Bender et al., 2020[51]	United States (Philadelphia, Pennsylvania), Labor and Delivery unit April 13 – April 26, 2020	To assess the psychological experiences of asymptomatic obstetric patients who were tested for COVID-19	Obstetric Patients (N= 311)	Cohort study (involving a mixed methods approach, using both quantitative analysis of surveys and qualitative analysis of phone interviews)	-Salient themes were identified in COVID+ women: neglect and isolation, difficulty with neonatal separation -Emergent themes in COVID- women: fear of infection in the hospital, relief of fear when again at home and isolating, fear of leaving the house postpartum, fear of infant infection, difficulty with social isolation from family and friends, relief at testing negative for virus, confidence in their negative test, desire for additional testing, improvement in fear/anxiety as additional time from hospital passes	**Very low**
Farewell et al., 2020[59]	United States (Colorado), 2020	To employ a mixed methodology to assess the mental health and well-being, and of resilience, among perinatal women during the COVID-19 pandemic	Pregnant and postpartum women (N=31)	Cross-sectional (involving a mixed methods approach, using both quantitative analysis of survey data and qualitative analysis of phone interviews)	-Depression (12%) and moderate or severe anxiety (60%) symptoms, loneliness (40%) -Salient themes related to stress included uncertainty surrounding perinatal care, exposure risk for both mother and baby, inconsistent messaging from information sources and lack of support networks. -Sources of resilience included the use of virtual communication platforms, self-care behaviors, partner emotional support, being outdoors, gratitude, and adhering to structures and routines.	**Very low**
Kumari et al., 2021[60]	New Delhi, India	To conduct qualitative research comprising focus group discussions and in-depth interviews to capture peripartum women's lived experiences during the COVID-19 pandemic	Pregnant and postpartum women (N=25)	Cross-sectional study (involving qualitative analysis of focus groups)	-2 major themes emerged: 1) the psychological domain including the categories of thoughts, emotions, and behavior, and 2) the social domain comprising categories of relationships with family members and friends, perceived loss of social support, doctor-patient relationship, and social determinants of health.	**Very low**
Mizrak and Kabacki, 2021[30]	Turkey, 2020	To understand the experiences of pregnant women during the COVID-19 pandemic with a specific focus on their concerns, problems, and attitudes	Pregnant women (N=15)	Cross-sectional (involving qualitative analysis of phone interviews)	-3 themes and 11 sub-themes were identified. (1) not understanding the seriousness and fear of the unknown, (2) coronavirus pandemic and disruption of the routine prenatal care (3) disrupted routines and social lives. Each theme was necessarily discussed separately.	**Very low**

Table 4. Evaluating the Risk of Bias with Mays & Pope Criteria[58]Assessment Tool

	Bender et al., 2020[51]	**Farewell et al., 2020[59]**	**Kumari et al., 2021[60]**	**Mizrak and Kabacki, 2021[30]**
Worth or relevance 1. Was this piece of work worth doing? 2. Has it contributed usefully to knowledge?	1. Yes 2. Yes	1. Yes 2. Yes	1. Yes 2. Yes	1. Yes 2. Yes
Clarity of research question 3. If not at the outset of the study, by the end of the research process, was the research question clear?	3. Adequate, objective clearly stated	3. Adequate, research question broad, but clearly stated	3. Adequate, broad question, but clear	3. Yes, aim clearly stated
Appropriateness of the design of the question 4. Was an appropriate method used?	4. Yes	4. Yes	4. Yes	4. Yes
Context 5. Is the context or setting adequately described so that the reader could relate the findings to other settings?	5. Yes adequate - very clear context	5. Inadequate, poorly contextualized	5. Yes	5. Inadequate, not well contextualized
Sampling (Selection bias) 6. Did the sample include the full range of possible causes or settings? 7. If appropriate, were efforts made to obtain data that might contradict or modify the analysis extending or modifying the sample?	6. No/inadequate 7. No	6. No 7. No	6. No 7. No	6. Adequate, snowball sampling method, but thematic saturation reached 7. No
Data Collection and Analysis (Measurement bias) 8. Were the data collection and analysis procedures systematic? 9. Was an "audit trail" provided? 10. How well did the analysis succeed in incorporating all the observations? 11. Did the analysis develop concepts and categories capable of explaining key processes? 12. Was it possible to follow iteration between data and theory? 13. Did the researcher search for disconfirming cases?	8. No - analysis not described 9. Yes 10. Unclear 11. Inadequate 12. Adequate 13. No	8. Yes 9. No/Inadequate 10. Adequate 11. Yes 12. Yes 13. No	8. Adequate 9. Unclear 10. Adequate 11. Yes 12. Yes 13. Yes	8. Yes 9. Unclear 10. Adequate 11. Yes 12. Yes 13. Yes
Reflexivity of the Account (Researcher bias) 14. Did the researcher assess the likely impact of the methods used on the data obtained? 15. Were sufficient data included in the reports to provide sufficient evidence for readers to assess whether analytical criteria were met?	14. No 15. No	14. Yes 15. Yes	14. Yes 15. No	14. Yes, discussed in limitations 15. Yes
Overall Risk of Bias	High	Medium	Medium	Medium

Table 5. Primary Outcome

Study	Primary outcome: Emotions Reported	Themes and subthemes surrounding emotional experiences of pregnancy, birth, and postpartum care
Bender et al., 2020[51]	1. Loneliness 2. Fear 3. Anxiety 4. Relief	1.Neglect, isolation (COVID + women) 2.Difficulty with neonatal separation (COVID + women) 3.Fear of infection in the hospital; relief of fear when isolating at home 4. Fear of leaving house postpartum/causing infant infection 5. Difficulty from social isolation 6. Relief of anxiety after negative COVID test 7. Fear about testing positive 8. Desire for additional testing 9. Improvement in fear/anxiety as time from hospitalization passes
Farewell et al., 2020[59]	1. Uncertainty 2. Fear 3. Anxiety 4. Loneliness 5. Depression 6. Stress 7. Gratitude 8. Optimism	1. Uncertainty surrounding care and risk exposure *Subthemes*: *uncertainty surrounding prenatal care appointments, birthing plan expectations, in utero and infant exposure, mixed messaging (from healthcare system).* 2. Lack of anticipated support networks and loneliness *Subthemes: lack of excitement surrounding pregnancy, concerns about postpartum support, social isolation, and loneliness.* 3. Positive coping and resilience *Subthemes: partner support, emotional support, gratitude, increased bonding and family time, shifting expectations* 4. "Silver linings" of COVID-19 pandemic of perinatal mental health *Subthemes*: *Increased bonding and quality family time, not feelings left out of social opportunities*
Kumari et al., 2021[60]	1. Fear 2. Anxiety/worry 3. Guilt 4. Frustration 5. Suspicion 6. Irritability 7. Sadness 8. Depression 9. Distress 10. Helplessness 12. Boredom 13. Hopelessness	1. Psychological effects *Subthemes: fear of getting infection (fear, worry, guilt, and frustration), fear about newborn baby getting infected (fear, suspicion, irritability) fear and anxiety about inadequate perinatal services, fear of stigma if infected* 2. Social effects *Subthemes: anxiety due to financial issues, anxiety due to changed lifestyle, lack of support, decrease interaction / involvement* 3. Coping strategies *Subthemes: self-motivation, engagement in pleasurable activities and family time*
Mizrak and Kabacki, 2021[30]	1. Fear 2. Anxiety 3. Uncertainty 4. Comfort 5. Loneliness	1. Not understanding the seriousness and fear of the unknown *Subthemes: anxiety and fear, insufficient information from healthcare system* 2. Disruptions in prenatal care *Subthemes: postponement of pregnancy follow-ups, choosing safe health centers, support of health personal, comfort of living in small provinces* 3. Disrupted routines and lives *Subthemes: change of daily routines, social disruption and isolation, strategies for coping with anxiety*