



Pregnant people’s responses to the COVID-19 pandemic: A mixed methods descriptive study

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Abstract:	<p>Background: Given the extent of the COVID-19 pandemic and the uncertainty regarding its containment timing, understanding the experiences and responses of perinatal population is essential for planning responsive maternity care services during and after the pandemic. The aim of this study was to explore the experience and responses of pregnant women to the COVID-19 pandemic and identify ways in which healthcare providers can support this population.</p> <p>Methods: This mixed methods descriptive study was conducted between March 20th to May 31st, 2020 in British Columbia (BC), Canada. Any pregnant person at any gestational age living in BC was eligible to participate. Thematic and descriptive analyses were used to analyze data.</p> <p>Results: The study sample included 96 participants. Fifty four percent and 35% of the participants reported anxiety and depressive symptoms, respectively. Overarching themes emerged from the qualitative data included uncertainty about birth plans and setting, added burden to the existing health and social disparities, perceived/projected lack or limited support, concerns about early development and struggle over managing multiple demands. Perceived maternity care needs included mental health support, maintaining prenatal care, frequent and pro-active check-ins to build rapport and recommendations specific to the pandemic.</p> <p>Interpretation: The impact of the COVID-19 pandemic on pregnant</p>

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	population has been substantial. The findings of this mixed methods study provides some insights on these responses and experiences and can help planning informed and evidence-based healthcare service interventions to mitigate adverse effects and support mothers and families.

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Dr Jesse Elliott
Associate Editor
CMAJ Open

Dear Dr. Elliott,

Thank you for reviewing our manuscript, entitled “Pregnant people’s responses to the COVID-19 pandemic: A mixed methods descriptive study” for consideration for publication in *CMAJ Open* as an original study. We appreciate your feedback and we are submitting a new version of our manuscript that addresses the editorial comments as summarized below.

1. The manuscript should be formatted for CMAJ Open, including the use of subheadings for key methods sections
Revisions: We have included subheadings for methods sections and have formatted the manuscript based on the journal’s authors instructions.
2. As the current manuscript appears to present findings from a larger study, any publications describing the study should be cited. The larger study should be described as well as how the current study fits within the larger context.
Revisions: We have provided more descriptions about the PSAS study. A manuscript describing PSAS study is being developed (not published yet).
3. The recruitment of participants needs to be described.
Revisions: Participants were recruited during pregnancy through study posters distributed in prenatal care clinics and classes, LifeLabs and Social Media. We have included this information in the manuscript.
4. More information about the GAD-7 and EPDS is needed (ie to aid in the interpretation of the values in Table 1)
Revisions: We have added more information in methods section to describe these scales.
5. The development of the interview guides should be described.

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3 **Revisions:** The open-ended questions were developed by the research team. We have
4 added a statement to the methods section to clarify this.
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7 6. The methods used for the integration of the qualitative and quantitative data should be
8 described.
9 **Revisions:** The integration of qualitative and quantitative components occurred at the
10 interpretation level by embedding and merging the study conclusions. We have added
11 statements to the methods and discussion section to address this comment.
12
13 7. Page 4, line 7: what is the relevance of the number of words and characters provided
14 by participants to describe their experiences?
15 **Revisions:** We have removed this statement.
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18 8. Table 1 – is the geographic region of participants within the province known? Please
19 add additional details on location if available.
20 **Revisions:** We have added information about the geographic region of participants
21 grouped by BC’s regional health authorities in Table 1.
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23
24 9. Was gender identification collected from participants?
25 **Revisions:** Gender identification data were collected from participants. We have
26 added this information in Table 1.
27
28
29 10. Table 2 – each quote should be attributed to a participant (e.g., via ID numbers)
30 **Revisions:** We have provided participant ID as well as the date for each
31 representative quote.
32

33 This manuscripts reports findings of a mixed methods research study on the impact of COVID-
34 19 pandemic on pregnant people in BC. *CMAJ Open*, as a respected peer-reviewed Canadian
35 Journal, will be instrumental in broad dissemination of these relevant findings to health care
36 providers in various disciplines as well as public.
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39 This manuscript represents original work, has not been published previously, and is not being
40 considered for publication in any other journal. As this is a mixed methods study, we have
41 completed two checklists for reporting guidelines for qualitative and quantitative components of
42 the study. None of the authors have any conflicts of interest related to this work to disclose. The
43 manuscript does not infringe on any copyright. All authors have seen and approved the
44 manuscript.
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47 Thank you for your consideration of this manuscript. We look forward to receiving the results of
48 the review of our manuscript.
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Title

Pregnant people's responses to the COVID-19 pandemic: A mixed methods descriptive study

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Contributors

HB conceptualized the study, acquired, analyzed and interpreted the data and drafted the manuscript. ST acquired, analyzed and interpreted the data and revised the manuscript for important intellectual content. AB contributed to the interpretation of data and revised the manuscript for important intellectual content. All authors have approved the final version of the manuscript.

Declaration of interests

We declare no competing interests.

IRB approval

This study was reviewed and approved by the University of British Columbia Conjoint Health Research Ethics Board (H21-00489).

Data-sharing

Data are not publicly available.

Word count: 3118

Pregnant people's responses to the COVID-19 pandemic: A mixed methods descriptive study

Abstract

Background: Given the extent of the COVID-19 pandemic and the uncertainty regarding its containment timing, understanding the experiences and responses of perinatal population is essential for planning responsive maternity care services during and after the pandemic. The aim of this study was to explore the experience and responses of pregnant women to the COVID-19 pandemic and identify ways in which healthcare providers can support this population.

Methods: This mixed methods descriptive study was conducted between March 20th to May 31st, 2020 in British Columbia (BC), Canada. Any pregnant person at any gestational age living in BC was eligible to participate. Thematic and descriptive analyses were used to analyze data.

Results: The study sample included 96 participants. Fifty four percent and 35% of the participants reported anxiety and depressive symptoms, respectively. Overarching themes emerged from the qualitative data included uncertainty about birth plans and setting, added burden to the existing health and social disparities, perceived/projected lack or limited support, concerns about early development and struggle over managing multiple demands. Perceived maternity care needs included mental health support, maintaining prenatal care, frequent and proactive check-ins to build rapport and recommendations specific to the pandemic.

Interpretation: The impact of the COVID-19 pandemic on pregnant population has been substantial. The findings of this mixed methods study provides some insights on these responses and experiences and can help planning informed and evidence-based healthcare service interventions to mitigate adverse effects and support mothers and families.

Keywords: Perinatal period, COVID-19 pandemic, mixed methods descriptive study

Abbreviations

BC: British Columbia

COVID-19: coronavirus disease of 2019

EPDS: Edinburgh Postnatal Depression Scale

GAD-7: Generalized Anxiety Disorder Scale

PSAS: Pregnancy Specific Anxiety Scale

Introduction

Pandemics cause extensive social, psychological, economic and political disruptions and increase morbidity and mortality (1, 2). Analyses of the susceptibility of pregnant women to the coronavirus disease 2019 (COVID-19) suggested increased vulnerability due to physiological alterations in the respiratory, circulatory, and immune systems and reproductive hormones changes associated with pregnancy (3). Findings of a systematic review of 19 studies on pregnancy and perinatal outcomes of Coronavirus spectrum infections including COVID-19 showed higher rates of preterm birth (PTB), miscarriage, preeclampsia, cesarean, and perinatal death compared to the general population of pregnant women (4). In a UK cohort of pregnant women admitted to hospital between March 1st to April 14th 2020 with the COVID-19, 10% needed respiratory support in a critical care setting and the case fatality rate was 1.2% (5). Another study in France showed increased maternal morbidity and preterm birth and a 24.1% need for oxygen support among 54 pregnant women with confirmed or suspected COVID-19 infection between March 1st and April 3rd, 2020 (6). Among non-infected women, a 2021 systematic review showed a significant increase in stillbirth and maternal mortality during the pandemic compared with before the pandemic (7).

Historical data from the 1918 influenza pandemic, SARS, and other infectious disease outbreaks show that even if pregnant women are not infected they suffer disproportionately during such outbreaks (8-10). Pregnant women are often vigilant about the health and safety of their foetuses. A pandemic could intensify this apprehension as poor clinical outcomes among infected pregnant women (11) and higher rates of pregnancy loss and preterm births have been reported in pandemics (4, 10, 12, 13). Some medications for infectious diseases can also be harmful to the foetus (3, 8). Moreover, the media publicity regarding the mortality and morbidity associated with pregnancy can intensify fear among pregnant women (8).

Perinatal population is significant users of healthcare services in Canada (14). Pandemics may alter the capacity of healthcare systems to support routine healthcare services, including pregnancy, intrapartum, and postpartum care (15). In British Columbia (BC), Canada, with declaration of a state of emergency in the province on March 18th, 2020, most in-patient non-emergency health services and surgeries were postponed and outpatient services were offered through virtual care when possible. Given the extent of the COVID-19 pandemic and the uncertainty regarding its containment timing, understanding the experiences and responses of perinatal population is essential for planning responsive maternity care services during and after the pandemic. This study explores the responses of pregnant people to the COVID-19 pandemic in a convenient sample in BC and identifies ways in which healthcare providers can support this population.

Methods

This is a mixed methods descriptive study composed of cross-sectional and qualitative descriptive components. The data for this study were collected as part of the Pregnancy Specific Anxiety Scale (PSAS) study, an ongoing study when the COVID-19 pandemic emerged in Canada. The PSAS study was originally designed to develop a screening tool to assess pregnancy-specific anxiety and was implemented in 3 Phases. PSAS participants were recruited during pregnancy through study posters distributed in prenatal care clinics and classes, LifeLabs and Social Media across the province. Any pregnant person at any gestational age living in BC

was eligible to participate. The current study involved adapting Phase 3 of the PSAS study and utilized data collected between March 20th and May 31st 2020. Detailed information on individual, obstetric, and psychosocial characteristics were collected. The Edinburgh Postnatal Depression Scale (EPDS)(16) was used to assess depressive symptoms. EPDS is a widely used valid and reliable screening tool for perinatal depression and a cut-off score of 10 is recommended for community samples (17). Anxiety symptoms was assessed using the Generalized Anxiety Disorder Scale (GAD-7), a valid and reliable instrument for screening for GAD and its severity (18). Participants responded to six open-ended questions in writing to describe their thoughts, feelings, and experiences during the pandemic (Appendix A). These questions were developed by the research team with the aim to capture whether and how the outbreak had impacted women's everyday life, their physical and mental well-being and the pregnancy/baby, how they coped, and how healthcare provider(s) could support them better during the pandemic. There was no word limit imposed on the answering fields.

Statistical and data analysis

Individual, obstetric, and mental health characteristics were described using proportions, means, and measures of dispersion calculated using IBM SPSS Statistics version 25 (19). Simple line graphs were plotted to demonstrate the mean score for mental health symptoms from March 20th to May 31st with approximately 10-day blocks intervals. A qualitative descriptive approach (20) was used to analyse qualitative data. This approach is appropriate to address healthcare practice and policy inquiries where researchers stay close to the data to describe and interpret findings in everyday terms. The analysis was carried out using thematic analysis (21) by two female researchers (HB is an assistant professor with research experience in qualitative/mixed methods studies; ST is a research associate with doctoral qualification in Clinical Psychology). ST was known to the participants as she conducted clinical diagnostic interviews with them over the phone as part of the overall PSAS study. ST also debriefed all pregnant participants regarding their COVID-19 experience during their regular PSAS interviews. The analysts open coded each participant's input after reading. The codes were clustered into categories and then grouped into themes. The themes and categories were formulated to achieve a joint interpretation of the data. The qualitative data were managed using Microsoft Excel. Analytic rigor (i.e. visibility of research practice and accountability of data analysis) (22, 23) was ensured by an independent analysis of data by two researchers, participants' reflections, verbatim quotes, and reporting details of the participants' characteristics to enable readers to identify applicability to diverse populations. The integration of qualitative and quantitative components occurred at the interpretation level by embedding and merging the study conclusions.

Ethics approval

This study was approved by the University of British Columbia Conjoint Health Research Ethics Board (H21-00489).

Results

The study sample included 96 participants with a mean age of 32 years (3.92). The gestational age varied between 7 and 40 weeks (22.73 [8.93]) (Table 1). Fifty four percent of the participants reported anxiety symptoms ranging from mild to severe, as measured using GAD-7. Depressive symptoms were reported by 35% of participants.

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3 The first case of community transmission of COVID-19 in BC was confirmed on March 5th
4 2020, and the BC government declared a state of emergency on March 18th. The provincial
5 Health Authority provided daily updates on the number of new cases and these data are available
6 in the BCCDC website (<http://www.bccdc.ca/health-info/diseases-conditions/covid-19/data>). To
7 depict the intensity of the outbreak in the province during the study period, using these data, we
8 created a graph presenting the total number of new cases in the province for each study time
9 block with approximately 10 days intervals (March 20-31, April 1-10, etc.) for the duration of our
10 study (Figure 1). Simple line mean of anxiety and depression scores were also depicted by each
11 time block (Figures 2 and 3).
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14 The findings of the qualitative analysis are grouped under three overarching themes: a) responses
15 to the COVID-19 pandemic, b) participants' experiences related to the pandemic, and c)
16 perceived maternity care needs (Table 2).
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19 **a) Responses to the COVID-19 pandemic**

20 Two categories emerged from the participants' responses to the pandemic: psychological
21 responses and responses to the pandemic-imposed prenatal care and birth restrictions and
22 protective measures.
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25 *Psychological responses*

26 Participants reported a wide range of psychological responses to the pandemic: anxiety, grief,
27 mourning, sadness, fear, irritation, nervousness, anger, and feeling overwhelmed. Some also
28 reported panic attacks and insomnia. Several participants described these responses to be very
29 tense at the beginning of the pandemic in March which gradually eased down in May. The
30 central themes in the psychological responses were anxiety and grief.
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33 *Anxiety and Grief*

34 Participants reported multiple worries, such as anxiety about contracting the infection,
35 transmitting the virus to the foetus, lack of clear evidence on the impact of COVID-19 on
36 pregnancy and the developing foetus, the risks associated with a hospital birth and impact on
37 birth plans, availability of health services if required, inability to take medication during
38 pregnancy if they become ill, being isolated, impact of social distancing and related measures on
39 overall well-being during pregnancy and early motherhood, long-term impacts on infants and
40 children, the inability to develop social connections and support systems due to the pandemic,
41 increased childcare obligations, reduced instrumental support due to social distancing and travel
42 restrictions, the inability to deal with stress and anxiety in conventional ways (e.g. exercise and
43 visiting friends and family), job security, unemployment and the inability to accumulate required
44 work hours to be qualified for maternity leave, financial strains, and general anxiety about the
45 future and related uncertainties. Several participants identified a sense of loss and grief about
46 losing a 'normal' pregnancy experience and expressed irritation that a 'normal' experience had
47 been taken away from them.
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51 *Responses to pandemic-imposed prenatal care and birth restrictions and protective measures*

52 Participants reported the implementation of several restrictions related to their pregnancy care,
53 such as a support person not being allowed during prenatal care/ultrasound visits or a limited
54 number of support people being allowed during labour.
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Loss of support and connections

The participants reported a loss of support during pregnancy or projected loss of support during labour due to the restrictions. They expressed concerns that the restrictions have jeopardized/would jeopardize the quality of their pregnancy and birth experience by diminishing their support. Participants often noted that the new restrictions negatively impacted the support and connections that they had hoped to receive and develop.

Loss of control and autonomy

Having limited choices due to the restrictions and not knowing what to expect during the birthing process contributed to a sense of loss of control. Some participants commented that the uncertainty regarding the birthing process compromised her sense of control and provoked anxiety. Irritation, anxiety, and worry due to the restrictions were a recurring theme. It was evident that the pandemic-imposed maternity care constraints had created additional anxiety for the already anxious participants. Some described the impact of these restrictions as 'losing some freedom.' Concerns about an unfriendly and impersonal hospital environment due to personal protective measures also emerged.

b) Experiences related to the pandemic

This theme included uncertainty about birth plans and birth settings, added burden to the existing health and social disparities, perceived/projected lack or limited support, concerns about early development and struggles over managing multiple demands.

Uncertainty about birth plans and birth settings

Several participants reported feeling uncertain about the safety of hospitals and expressed fear of giving birth in a hospital setting due to the possibility of contracting COVID-19. A few participants commented that they are considering homebirths due these concerns. Two participants reported that despite having confirmed plans for a homebirth they were still fearful that at some point during the labour, they might have to be transferred to the hospital.

Added burden to the existing health and social disparities

Some participants reported anxiety due to frequent pharmacy or hospital visits due to pregnancy and its complications. Participants with limited resources as well as new immigrants also reported additional stress and burden.

Perceived/projected lack or limited support

Some participants described the expectation of limited support around labour as daunting. Concern was expressed about uncertainties regarding childcare when they go into labour, having a complicated or caesarean delivery and recovery, and whether their close family members would be available to support them considering the travel restrictions and social distancing. Mothers expecting a second or third child also expressed worries about being overwhelmed while self-isolating and not having support from partners who may or may not be able to take time off work due to finances.

Concerns about early development

Participants expressed concerns about how isolation and social distancing would impact their child. They also reported concerns related to their own elevated anxiety during pregnancy and its potential consequences on the developing foetus.

Struggle over managing multiple demands

Most participants in this study had a paid job during pregnancy (over 90%) and some reported stress about multi-tasking and work/life balance. Several participants were frontline workers or partners of frontline workers. An additional layer of anxiety was evident among these participants.

c) Perceived maternity care needs

We asked participants how their healthcare providers could support them better during the pandemic. Several participants reported that they had found their healthcare providers supportive and understanding. Participants also identified several health care needs as presented in the following section.

Maintaining prenatal care visits

Some participants reported an interruptions in their maternity care services such as cancelled appointments or reduced number of visits early during pandemic. They identified a need for maintaining prenatal care visits and for the latest information regarding the specific effects of COVID-19 on pregnancy provided by their care providers. Several participants also expressed worries about potential implications of the next waves of pandemic for their health care.

Offering the option of in-person visits

Many participants reported receiving virtual care. Due to less frequent or virtual visits, a few women reported concerns that some health issues might be 'missed' and not identified.

Partner engagement

Some participants suggested engaging and educating partners on how to support pregnant women. Particularly because partners were not often allowed in prenatal care or ultrasounds visits.

Frequent and pro-active check-ins to build rapport

Due to cancelled, less frequent or short virtual appointments, some participants reported a feeling of a lack of connection with their maternity care providers. They also noted experiencing difficulty in building rapport with their providers through virtual care. Participants stated that more frequent contacts would help them to develop a relationship with health care providers to feel more comfortable during labour. They also noted that the increased availability of their providers for more phone check-ins, answering questions, and some pro-active check-ins would be helpful.

Mental health support

Most participants reported a significant need for mental health support in the form of 'check-ins', coping advice for pandemic-related anxieties and constraints and setting up counselling and psychology appointments.

Interpretation

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3 This study provides insights into pregnant people's experiences and responses to the COVID-19
4 pandemic and their perceived maternity care needs. Qualitative quotes and quantitative trend of
5 anxiety symptoms in our sample indicated highly elevated anxiety symptoms at the onset of the
6 pandemic that gradually eased down as the number of new cases in the community decreased.
7 Pregnant women reported multiple stressors related to the pandemic and 44% reported anxiety
8 symptoms. Previous Canadian community based studies with similar inclusion criteria reported a
9 rate of 15-19% anxiety symptoms (24). Similar findings on poor maternal mental health during
10 the pandemic have been reported globally (7, 25-27). The most dominant psychological
11 responses in our study were anxiety and grief indicating that mental health support,
12 consultations, and interventions should be focused on these issues.
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16 With pandemic causing significant shifts in hospital routines, some participants reported that the
17 uncertainty over the birth plans and not knowing what to expect during a hospital visit have
18 provoked or intensified their anxiety. Providing more tangible information on new hospital
19 birthing processes (e.g. offering a virtual tour of the labour and delivery unit to demonstrate the
20 modifications made due to the pandemic and details on personal protection measures and safety)
21 can help pregnant people become familiar with the new environment, be mentally prepared, and
22 gain confidence about the safety of a hospital birth. This information can serve to reduce their
23 anxiety over the unknown component of the birthing process during the pandemic.
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26 While the restrictions and protective measures have been implemented to protect patients,
27 healthcare providers, and public, participants in this study noted that these measures have also
28 imposed additional burden on them by limiting access to support and diminishing sense of
29 control and autonomy during pregnancy and the birthing process. Data from previous pandemics
30 have shown that outbreaks can jeopardize the capacity of healthcare services in general (15).
31 There is some emerging evidence suggesting a potential increase in labour interventions among
32 COVID-19 infected women (4, 13). In a recent systematic review of six studies of 51 pregnant
33 women diagnosed with COVID-19, almost all of them delivered through caesarean section,
34 frequently before term, and without any clear indication for an operation. Although COVID-19
35 may be associated with spontaneous preterm birth, it has been suggested that the increased risk
36 of preterm birth is a consequence of elective interventions carried out as a precautionary measure
37 (13). During early pandemic, some hospitals adopted policies that could potentially increase
38 labour interventions (28, 29). However, a 2021 systematic review did not find an overall change
39 in labour induction and cesarean rates during pandemic among non-infected women (7).
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43 Many participants expressed concerns regarding the development of their babies and whether
44 social isolation would impact early development. While evidence on the effect of pandemics on
45 child development is scarce, disaster studies show that adverse changes in maternal mental health
46 after a disaster strongly influence child development (30) and affect the early development of
47 children to a greater extent than the disaster itself (31). Participants also reported concerns about
48 how their own mental health challenges and stresses related to the pandemic would influence the
49 growth and development of foetuses. There is evidence showing that poor perinatal mental health
50 is linked to higher rates of low birth weight and preterm birth (32-34), poor cognitive,
51 behavioural, and psychomotor development and mental health problems in children (32, 35-39).
52 Further research is needed to elucidate the impact of this pandemic and the associated social
53 distancing actions on the short-term and long-term developmental trajectories.
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Limitations

The launch of data collection just after the World Health Organization's announcement declaring COVID-19 a pandemic enabled us to explore and understand pregnant women's experiences and responses during the first wave. Depiction of psychological responses of participants based on the intensity of the outbreak in the community also provided further insights on psychological impact of the pandemic. Nevertheless, this study has several limitations: it is a small study conducted in one geographical area and the findings might only be applicable to settings with a similar outbreak intensity. The majority of the participants were educated, Caucasian, and partnered; these characteristics could also have limited the transferability of the findings. We provided the details of participants' characteristics to enable readers to determine the applicability of the study's findings to their populations.

Conclusion

The impact of the COVID-19 pandemic on perinatal population has been substantial. The findings of this mixed methods descriptive study provides some insights on the impact of the pandemic on this population and can help planning informed and evidence-based healthcare service interventions to mitigate adverse effects and support mothers and families. Further research is required to understand the short- and long-term physical, psychological and developmental impact of the COVID-19 pandemic on perinatal population.

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Table 1. Characteristics of Participants (N=96)

Variables	Mean (SD)
Age (years)	31.70 (3.92)
Gestational age at recruitment (weeks)	22.73 (8.93)
GAD-7	5.76 (4.19)
EPDS	7.31 (3.97)
	n (%)
Primigravida	33 (34.4)
Multigravida	63 (65.6)
Problems or complications during pregnancy	28 (29.2)
Not received prenatal care as early as wanted	13 (13.5)
Married, Common-law or live-in partner	94 (97.9)
Education	
High school/ diploma/certificate/ incomplete university	34 (35.4)
University degree	62 (64.6)
Household income	
Under \$40,000	6 (6.2)
\$40,000 - \$99,999	37 (38.6)
\$100,000 and above	53 (55.2)
White (Caucasian) racial/ethnic background	70 (72.9)
Gender ^a	
Female	89 (92.7)
Male	0
Non-binary	1 (1.0)
Paid work during current pregnancy	89 (92.7)
Born in Canada	74 (77.1)
Geographic region ^b	
Fraser Health	32 (33.3)
Vancouver Coastal Health	28 (29.2)
Interior Health	21 (21.9)
Island Health	6 (6.3)
Northern Health	1 (1.0)
Mild anxiety (GAD-7 score: 5-9)	33 (34.4)
Moderate anxiety (GAD-7 score: 10-14)	13 (13.5)
Severe anxiety (GAD-7 score >14)	4 (4.2)
Depressive symptoms (EPDS score ≥10)	34 (35.4)

^a missing data for 6.3% of the sample population

^b missing data for 8.3% of the sample population

Table 2. Summary of themes emerged from qualitative data and representative quotes, March 20th to May 31st 2020, British Columbia, Canada

Responses to the COVID-19 Pandemic	
Theme/category	Representative quote
<i>Psychological responses</i>	
<i>Anxiety and Grief</i>	<p>‘It's had a major impact mentally and physically... I had my anxiety in check, it was well managed, now I feel anxious everyday. I've felt panic, I'm teary and emotional.’ (Participant 28, March 29th)</p> <p>‘It is something I think about and get frustrated about... thinking why does it have to happen during my pregnancy?’ (Participant 6, April 1st)</p> <p>‘I have been sad most days as this was not how we planned for the pregnancy to go. After five and a half years of trying to get pregnant, we really wanted to celebrate this baby; this will now change our plans’. (Participant 38, April 6th)</p> <p>‘It had a huge impact two months ago, when it began. Mid-March when everything was ramping up and the world was changing. That was also when we had our detailed ultrasound and the small pleural effusion was noted. I just completely ran out of any ability to cope. I think I had a panic attack, I couldn't stop worrying, crying. And of course then I worried about my mental state having an effect on the baby. I'm happy to say I've been doing a lot better since the end of March. It feels like we adapted to this new reality. We're healthy and safe. The pleural effusion is gone, baby is healthy and safe. I feel much more calm and steady now.’ (Participant 71, May 11th)</p> <p>‘It has impacted my mental health. I'm a bit better this month, but I was really stressed out in March and parts of April while I was in the first trimester. I'm not coping with the uncertainty well, and I'm upset because these are my last few months of being in a childless couple and I'm not getting to savour in our freedom as much as I'd like.’ (Participant 80, May 13th)</p> <p>‘Definitely increased anxiety in a lot of areas I never would have had anxiety pre pandemic (hospital setting, will my spouse be allowed in, what will my quality of care look like in hospital, will they be rushing me out before I'm ready) all thoughts of unknown and worry around these factors increasing anxiety.’ (Participant 92, May 23rd)</p>

	<p>‘It [pandemic] has definitely impacted me and my experience with pregnancy. It has taken away many of the experiences I was looking forward to, removed the majority of human-human interaction from my life and placed a whole lot of uncertainty on a time already filled with so many physical and mental changes. Only time will tell if/how it impacts my baby. I can only hope this doesn't continue throughout baby's first year of life.’ (Participant 89, May 28th)</p>
<p><i>Responses to pandemic-imposed prenatal care and birth restrictions and protective measures</i></p>	
<p><i>Loss of support and connections</i></p>	<p>‘My partner is no longer allowed to attend our OB appointments due to COVID and his emotional support has been very important to me during those appointments because I have a phobia of doctors and often forget what the doctor says, or I forget to ask the questions I need to ask. Not having him there to see the ultrasounds or hear the heartbeat interferes with his ability to attach, and our shared experience of attachment with our baby’. (Participant 13, March 27th)</p> <p>‘My boys were looking forward to the ultrasound but I wasn't allowed any extra people due to precautions. I cried during the ultrasound.’ (Participant 53, April 24th)</p>
<p><i>Loss of control and autonomy</i></p>	<p>‘The uncertainty of restrictions at the hospital makes me feel a loss of control and has significantly impacted my anxiety (i.e. will the Doula we paid for be allowed, how will we safely leave the hospital to minimize exposure, how clean will the staff and room be, will there be adequate staffing, will me and baby be in danger, will I have less choice/control due to these restrictions?)’ (Participant 13, March 27th)</p> <p>‘Fear of the unknown [and] lack of control and freedom contribute to the return of moderate anxiety and depression, feelings of being mentally trapped, I feel [like] I'm grieving, losing some freedom’. (Participant 28, March 29th)</p> <p>‘I feel slightly worried and a bit angry over choices that have been taken away from me, such as having a support person present during my prenatal and ultrasound appointments’. (Participant 30, April 9th)</p>

Pregnant people's responses to the COVID-19 pandemic 1.

	‘I [am] also nervous about everyone being donned in masks and goggles while I'm delivering; not very personal’. (Participant 35, April 10 th)
Experiences Related to the Pandemic	
Theme/category	Representative quote
<i>Uncertainty about birth plans and setting</i>	<p>‘I am scared how the virus will impact our plan for a hospital birth and what risks are going to be associated with a hospital birth’. (Participant 7, March 29th)</p> <p>‘I wanted to possibly have a home birth prior to this pandemic, but now I am fully planned on delivering at home. I worry that I may have to go to hospital with baby even if I deliver at home... What if I tear, bleeding doesn't stop etc. I don't want to bring baby into a hospital.’ (Participant 28, March 29th)</p>
<i>Added burden to existing health and social disparities</i>	‘We also don't have a vehicle and have been told to avoid public transit and carshares; so for my biweekly OB appointments, I'm needing to walk an hour each way, which is exposing me to others I pass on the sidewalk or bridge (which worries me) and it is also hard on my body at this stage in [the] pregnancy’. (Participant 13, March 27 th)
<i>Perceived/projected lack of /limited support</i>	<p>‘The vision of introducing our baby to our closest friends and family in person will now be by FaceTime which is depressing. I worry how a lack of socialization will impact the baby over time’. (Participant 7, March 29th)</p> <p>‘Allow more than one person during my delivery. I need both my husband and my mom and I'm being forced to choose one. It's horrible to put people in these positions.’ (Participant 58, April 24th)</p> <p>‘We can't even plan how we are going to manage maternity / paternity leave because my husband works out of province and flies so is in a higher risk category according to my doctor and we don't know if he can keep working or will need to take time off so he can bond with baby. If his camp has an outbreak near my due date he could be put on another 14 day self-isolation and miss the birth. He will be taking over a month of holidays but if baby comes early it could be in a possible Isolation window and I'll have to do it without him... I am alone 50% of every month while husband works, we are in separate beds & bathrooms 25% of every month for 1 of his 2 weeks at home as a precaution due to his camp work and flights, and try to get back to normal the last 25% of each month... Specially my in-laws either work in health care or have been continuing to meet with other for "distancing walks" or "distant visits" which I don't think entirely</p>

	follow the safety recommendations and I'm worried they won't take the risk seriously enough and I will become a bad guy for protecting my new born by keeping the baby away from those who I don't think are keeping safe enough. I am already judged for "being paranoid " or "taking it too seriously " but many pregnant friends or friends with little ones feel the same. I plan to put my little ones safety first, if needed even at the expense of those other relationships which sucks.' (Participant 89, May 28 th)
Concerns about early development	'I feel worried about how the stress is impacting my developing baby. If we were not in this current situation, my stress and anxiety levels would be much lower. I could manage my stress in normal ways like meeting up with friends or taking my children to go do something fun. Instead it feels like constant stress with no break or end in sight'. (Participant 32, April 11 th)
Struggle over managing multiple demands	<p>'.....has increased my anxiety. Concerned about working at my job....Concerned that I will contract the virus and there have been few studies identifying whether it is passed through vertical transmission, harm to fetus.' (Participant 15, March 25th)</p> <p>'It (the pandemic) has certainly caused stressed stemming from work/life balance. My workload is mounting as I have fewer hours in the day to work trying to care for my child at home now. When I am working, I feel guilty I'm not focused on my child and when I'm not working, I feel stressed about falling more behind'. (Participant 18, April 2nd)</p> <p>'Work is more challenging. PPE makes nausea challenging...It's [also] hard sitting with [the] pregnant people in my care through their anxieties'. (Participant 43, April 17nd)</p>
Perceived Maternity Care Needs	
Theme/category	Representative quote
Positive experiences: A supportive system	'My health care provider has answered my questions about the hospital well and has found adaptive and creative ways to ensure I had the information I needed. At the midwifery/family doctor maternity care clinic I attend, they offer group classes for end of 2nd trimester/beginning of 3rd trimester. When those were cancelled due to COVID-19, they created a condensed, online, Zoom version which was really helpful. They also provided the typical hospital tour (which was now not allowed) by a youtube video. Both of these efforts helped to reduce uncertainty and provide knowledge and familiarity with the experience to come. It helped reduce some of my nervousness about labour.' (Participant 90, May 26 th)

Pregnant people's responses to the COVID-19 pandemic 1

	<p>'My doctor has been amazing. She is new to me (since week 17) and has called me every few weeks to chat, even before the pandemic broke out in Canada. She has provided me with protocols/procedures so that I feel prepared should I contract Covid. She has provided me with update research of the realities of the impact that Covid-19 has on pregnant mothers/babies and also given me various reliable social media pages to be following.' (Participant 46, April 22nd)</p>
<p><i>Maintaining prenatal care visits</i></p>	<p>'I understand why in person appointments aren't possible now, but it is really hard to feel connected to healthcare providers over the phone. I think video calls work better.' (Participant 73, May 13th)</p> <p>'My midwife appointments have been monthly, alternating between online and in person. I haven't felt the need for additional check-ins, however I'm sure some people would.' (Participant 86, May 19th)</p> <p>'Keeping visits as normal as possible. More in person and less telehealth would be nice, but I understand it's not reasonable at this point.' (Participant 94, May 25th)</p>
<p><i>Offering the option of in-person visits</i></p>	<p>'The prenatal appointment schedule includes a lot less frequent visits which worries me that things could get missed'. (Participant 20, April 1st)</p> <p>'My maternity doctor still sees me in person which I really appreciate and it's being big support for me.' (Participant 76, May 20th)</p>
<p><i>Frequent and pro-active check-ins to build rapport</i></p>	<p>'I think I am feeling a lack of connection to them and had hoped to be building stronger relationships with them so I feel more comfortable with them during my delivery.' (Participant 78, May 12th)</p> <p>'More check ins would be nice. We have no appointments until 20 weeks after initial intake.' (Participant 74, May 13th)</p> <p>'More regular check-ins via email or phone call. Providing available resources for those who aren't aware of them.' (Participant 88, May 20th)</p> <p>'More regular check ins. I still have appointments with midwife but no family doctor or any other health care provider to check in during those 1-1.5 months with no appointment. The health coverage I have for counselling is not great so I have not been talking with a professional.' (Participant 82, May 26th)</p>

<i>Mental health support</i>	‘They can emotionally support their patients.’ (Participant 27, April 2 nd) ‘Setting up a counselling/psychology appointment.’ (Participant 63, May 1 st)
<i>Partner engagement</i>	‘They could let me take a video of my ultrasound so I can actually share it with my husband since he's not allowed to join me at my ultrasound appointments and missed the last one. Hospital policy wouldn't even let me FaceTime him live for a moment to show him the movement and heartbeat at 20 weeks. It really sucked not being able to share that with anyone, even though the tech was lovely and got some great pics.’ (Participant 89, May 28 th)

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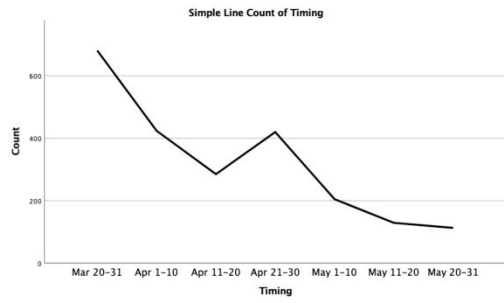


Figure 1. Simple line of total number of new cases by each time block, March 20th to May 31st 2020, British Columbia, Canada

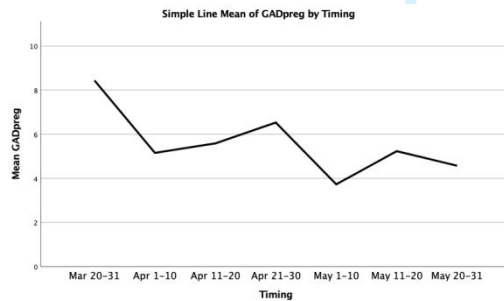


Figure 2. Simple line mean of anxiety score by each time block, N= 96, March 20th to May 31st 2020

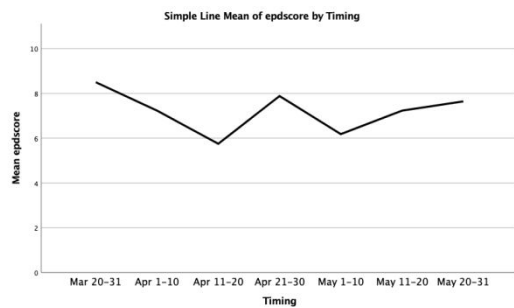


Figure 3. Simple line mean of depression score by each time block, , N=96, March 20th to May 31st 2020

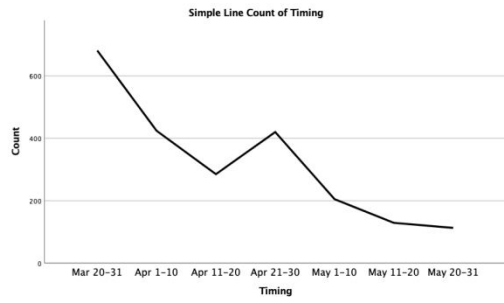


Figure 1. Simple line of total number of new cases by each time block, March 20th to May 31st 2020, British Columbia, Canada

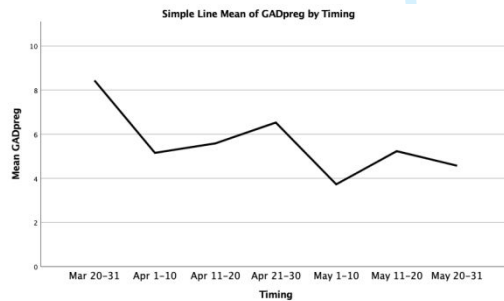


Figure 2. Simple line mean of anxiety score by each time block, N= 96, March 20th to May 31st 2020

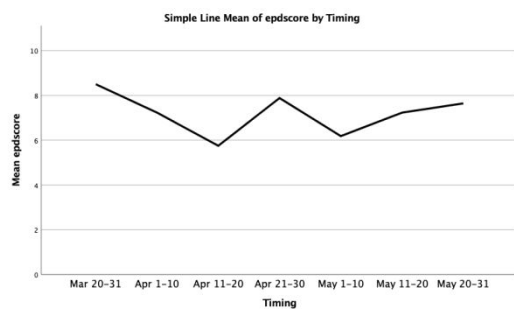


Figure 3. Simple line mean of depression score by each time block, , N=96, March 20th to May 31st 2020

Appendix A: Open ended questions

PREGNANCY

1. As a pregnant person, what are your thoughts and feelings about the recent pandemic of Coronavirus (COVID-19)?
2. How has this outbreak has impacted your life and your plans if any?
3. What are your thoughts on whether this pandemic has impacted your pregnancy/baby?
4. What are your thoughts on whether this pandemic has impacted your physical and mental well-being?
5. How do you cope with this pandemic?
6. How can your healthcare provider(s) support you during this pandemic?

POSTPARTUM

1. As a parent, what are your thoughts and feelings about the recent pandemic of Coronavirus (COVID-19)?
2. How has this outbreak impacted your life and your plans if any?
3. What are your thoughts on whether this pandemic has impacted your baby?
4. What are your thoughts on whether this pandemic has impacted your physical and mental well-being?
5. How do you cope with this pandemic?
6. How can your healthcare provider(s) support you during this pandemic?

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
<i>Personal characteristics</i>			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
<i>Relationship with participants</i>			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
<i>Theoretical framework</i>			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
<i>Participant selection</i>			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
<i>Setting</i>			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
<i>Data collection</i>			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat interviews carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the interview or focus group?	
Duration	21	What was the duration of the interviews or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
<i>Data analysis</i>			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
<i>Reporting</i>			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item No	Recommendation	Page No
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	1
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	2
Objectives	3	State specific objectives, including any prespecified hypotheses	2
Methods			
Study design	4	Present key elements of study design early in the paper	2
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	2-3
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	2-3
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	2-3
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	2-3
Bias	9	Describe any efforts to address potential sources of bias	3
Study size	10	Explain how the study size was arrived at	3
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	3-4
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	3-4
		(b) Describe any methods used to examine subgroups and interactions	NA
		(c) Explain how missing data were addressed	NA
		(d) If applicable, describe analytical methods taking account of sampling strategy	NA
		(e) Describe any sensitivity analyses	NA
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	3-4
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA

Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 1
		(b) Indicate number of participants with missing data for each variable of interest	NA
Outcome data	15*	Report numbers of outcome events or summary measures	Table 1
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	3-4, Table 1
		(b) Report category boundaries when continuous variables were categorized	NA
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	6-8
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	7-8
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	6-8
Generalisability	21	Discuss the generalisability (external validity) of the study results	7-8
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Acknowledgement

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.