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Complete List of Authors:	Mollons, Meghan; University of Manitoba, Psychology Levasseur-Puhach, Sydney; University of Manitoba, Psychology Kaur, Jasleen; University of Calgary, Psychology Doyle, Jennifer; The University of British Columbia, Educational and Counselling Psychology Giesbrecht, Gerald ; Alberta Children's Hospital Research Institute; University of Calgary, Department of Community Health Sciences Lebel, Catherine; University of Calgary, Department of Radiology; Alberta Children's Hospital Research Institute Woods, Lindsay; New Directions Tomfohr-Madsen, Lianne; The University of British Columbia, Educational and Counselling Psychology Roos, Leslie; University of Manitoba, Psychology; University of Manitoba Children's Hospital Research Institute of Manitoba
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Health Service Access and Social Support Linked to the Mental Wellbeing of Indigenous Pregnant Persons during the COVID-19 Pandemic

Meghan O. Mollons[1], Sydney Levasseur-Puhach[1], Jasleen Kaur[2], Jennifer Doyle[3], Gerald Giesbrecht[4,5], Catherine Lebel[6], Lindsay Woods[7], Lianne Tomfohr-Madsen*[3], Leslie E. Roos*[1,8,9]

[1]Department of Psychology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N
[2] Department of Psychology, University of Calgary, Calgary, Alberta, Canada, T2N 1N4
[3] Department of Educational and Counselling Psychology, and Special Education, University of British Columbia, Vancouver, British Columbia, V6T 1Z4
[4] Departments of Pediatrics and Community Health Sciences, University of Calgary, Calgary, Alberta, Canada, T2N 1N4
[5] Owerko Center at the Alberta Children's Hospital Research Institute, Calgary, Alberta, Canada, T2N 1N4
[6] Department of Radiology, Alberta Children's Hospital Research Institute, University of Calgary, Calgary, Alberta, Canada, T2N 1N4
[7] New Directions, Winnipeg, Manitoba, Canada, R3G 0M8
[8] Children's Hospital Research Institute of Manitoba, Winnipeg, Manitoba, Canada, R3E 3P4
[9] Rady Faculty of Health Sciences, University of Manitoba, Winnipeg, Manitoba, Canada, R3E 0W2

*co-senior authorship

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Abstract

Background: The COVID-19 pandemic brought widespread health restrictions and limited prenatal care for pregnant individuals. Many Indigenous families, who already face social and health inequalities, saw further restrictions to accessing quality care, unpredictable changes in birthing plans, serious illness inequities, and limited social support. We sought to explore how the unprecedented stressors associated with the COVID-19 pandemic may have contributed to heightened levels of depression and anxiety amongst pregnant Indigenous persons and identify protective individual-level factors.

Methods: In a cross-Canada sample of 336 pregnant Indigenous persons, we describe prevalence rates of clinically-elevated depression and anxiety symptoms using standardized measures. Using hierarchical regression models, we examined the extent to which COVID-related factors of service disruption (i.e., changes to prenatal care, changes to birth plans, and social support) were associated with mental wellbeing. Further, through qualitative analyses on open-ended coping questions, we examined the coping strategies utilized by pregnant Indigenous persons in response to the pandemic.

Results: Descriptive results revealed elevated rates of clinically relevant depression (52.7%) and anxiety (62.5%) symptoms among this population. 76.8% of participants reported prenatal care service disruptions, including appointment cancellations. Thematic analyses identified coping themes of staying informed, social and/or cultural connections and activities, and internal mental wellbeing strategies.

Conclusion: Disruptions to services and decreased quality of prenatal care negatively impacted mental wellbeing of Indigenous persons during the COVID-19 pandemic. Given the potential for mental wellbeing challenges to persist, and long-term effects of perinatal distress, it is important to examine the quality of care that pregnant individuals receive. Service providers should advance policies and practices that promote relationship quality and health system engagement as key factors linked to wellbeing during the perinatal period, for Indigenous persons.

Keywords: Prenatal care, Indigenous health, Indigenous pregnancy, service provision, COVID-19

Supportive and ongoing prenatal care is vital to optimize pregnancy outcomes [1,2,3), with regular and secure access to high-quality prenatal care supporting the mental and physical health of the pregnant person, thereby increasing the likelihood of birthing a healthy child [4,5]. By providing education, counselling, and emotional support, prenatal care can help pregnant people maintain their overall well-being and promote positive outcomes [5]. Establishing a long-term relationship with care providers also ensures consistent and coordinated care, builds trust and improves communication, allows for more personalized care, and promotes positive health outcomes for the birthing parent and baby [6,7].

The COVID-19 pandemic brought widespread health restrictions, limiting people's access to health care practitioners and services, including prenatal care [8,9]. Due to the historical and ongoing impacts of colonialism, Indigenous Peoples of Canada already experience tremendous health inequities, including restricted access to healthcare [10,11]. Access to pregnancy- specific healthcare services is also impacted by issues such as cultural misalignment, distance to services, cost, lack of transport, and lack of awareness of available services [12,13]. Additionally concerning are the ways in which distrust of systems of support and systemic racism can impede access to care. In Canada, a deficit-based discourse around Indigenous health has contributed to stigmatization, discrimination, and marginalization of Indigenous Peoples' [14, 15]. Consequently, this leads to a lack of trust in the healthcare system, making pregnant Indigenous persons less likely to seek care [16].

As a result of the COVID-19 pandemic, prenatal care was restricted across Canada, with some individuals experiencing limited or complete loss of access to their primary health care providers, obstetricians, and/or midwives, and limited social support during their pregnancies [17,2]. Smylie and colleagues (2021) found that even pre-pandemic, Indigenous peoples had to travel away from their home communities more often for prenatal care, particularly birthing, highlighting disparities in care accessibility. Coupled with a lack of social support and ongoing systemic racism, this resulted in increased stress levels for pregnant Indigenous persons [18].

Mental Wellbeing in the Prenatal period

Pregnancy is a time of major change for individuals, both physically and psychologically, and is often associated with increased feelings of stress [19,20]. Substantial research has demonstrated heightened levels of prenatal depression and anxiety experienced during the COVID-19 pandemic compared to pre-pandemic [21,22,23,25]. Pregnant individuals with specific sociodemographic factors, such as decreased income and lower education levels, are more vulnerable to adverse mental wellbeing symptoms during pregnancy [26,27,28]. Canadian Indigenous populations are at a particular disadvantage in this regard [29] due to the economic disadvantages they experience as a result of continuing legacies of colonialism [10]. Across Canada, approximately one-in-five Indigenous persons live in poverty and one-in-six experience difficulties with their current form of housing [30]. In addition to these economic disparities, Indigenous persons are also between one-and-a-half to five times as likely to experience trauma-inducing experiences such as childhood abuse and intimate partner violence [31]. Maintaining positive mental wellbeing and low stress levels can have positive health outcomes for both the pregnant individual and their developing baby [20]. This can prove difficult for Indigenous communities who already face barriers in accessing proper prenatal care and mental wellbeing support [32,24].

Service Disruptions

Adequate and accessible service provisions are vital to the health and wellbeing of pregnant persons. Groulx and colleagues (2021) noted that service disruptions increased mental wellbeing concerns among Canadian pregnant individuals. While social distancing and virtual doctor appointments have been the primary alternative for health services in Canada [33, 34], this requires individuals to have adequate housing, reliable internet access, and access to electronic devices, most of which is not easily accessible to a large portion of the population, particularly in many Indigenous communities [35] which face significantly more barriers in accessing medical care, specifically prenatal care, than non-Indigenous populations, [36, 24], including forced travel from home communities to larger cities to give birth. This further restricts social support availability and access to adequate health care [24]. Long-distance travel for birthing has increased during the COVID-19 pandemic as obstetrical and health services were closed [24]. Indigenous persons who are pregnant face poorer birth outcomes, including higher rates of low-birthweight, preterm birth, and stillbirth [36,37], related to the racial disparities in access to and quality of prenatal care [38].

Social Support

The World Health Organization (2015) reports that community support and engagement is largely impactful to positive outcomes among pregnant people. Social support, specifically partner support, has been cited as a resiliency factor for pregnant individuals, particularly those with high-risk pregnancies [39,40,24]. Social support during the prenatal period can mitigate adverse mental wellbeing outcomes for pregnant individuals, and subsequently, developmental outcomes for their babies, such as low birthweight [39,20,34]. However, due to the COVID-19 pandemic, support persons were frequently not allowed to join doctor appointments or had limited involvement in the birthing process, adding to the stress levels of pregnant individuals [2,24].

Coping Strategies

Commonly used coping strategies for pregnant people during the pandemic include avoidance, connection with spirituality, and preparation [41,42,43]. For Indigenous persons specifically, perinatal stress can be experienced at a greater intensity than in other demographics [44,45]. However, reported coping strategies in the literature generally focus on substance use as a coping method, in the context of pregnant Indigenous persons [46,47,48,49].

Current Study

There is limited knowledge on the impacts of prenatal service disruption due to the COVID-19 pandemic on pregnant Indigenous persons, and how changes to birth plans and support levels have impacted the mental wellbeing of individuals pregnant during the COVID-19 pandemic. The objectives of the present study were to (1) examine mental wellbeing (i.e., anxiety and depression symptoms) among a sample of pregnant Indigenous persons during the COVID-19 pandemic, (2) to examine the associations of pandemic related service disruptions (i.e., changes to prenatal care, changes to birth plans) and social support with mental wellbeing, and (3) to generate knowledge on Indigenous pregnant peoples self-described coping strategies, as they relate to the mental wellbeing of this population. This study aims to further develop an understanding of both adaptive and maladaptive coping strategies used among Indigenous pregnant persons throughout the pandemic. Obtaining this information may be done most

appropriately using a qualitative approach based on literature suggesting that these methods are most ethically aligned with culturally safe research practices [50].

Methods

Participants

The current study reports data collected from the Pregnancy During the COVID-19 Pandemic study [2], an ongoing longitudinal study examining the health impacts of the COVID-19 pandemic on pregnant individuals and their children. Participants were recruited through online recruitment methods, including social media posts and ads on Facebook, Instagram, and Twitter. Participants were invited to join the study if they met the inclusion criteria of: residing in Canada, having the ability to read and write in English and/or French, and having a confirmed pregnancy <35 weeks gestation [33]. Participants were not asked to partake in the study design development. This study was approved by the University of Calgary Conjoint Health Research Ethics Board (REB20-0500).

For the purpose of this study, data include only participants who self-identified as Indigenous (First Nations, Métis, Inuit) or mixed Indigenous descent. Out of the larger sample (*N* = 10,669), 336 individuals self-identified as Indigenous; 45.2% self-identified as Métis, 42.6% self-identified as First Nations, 11.3% self-identified as mixed Indigenous ancestry, and 0.9% self-identified as Inuit. Participants were located in Quebec (25.3%), Ontario (18.8%), Alberta (18.2%), British Columbia (13.7%), Manitoba (11.0%), Saskatchewan (6.8%), Nova Scotia (3.3%), Northwest Territories (1.2%), Yukon (1.2%), and Newfoundland and Labrador (0.6%). On average, participants were 30.33 ± 5.0 years old. Most participants were married or living with a common law partner (86.9%), had completed community college, an equivalent trade or vocational degree, or greater (77.7%), and had an annual household income greater than $70,000 CAD (57.8%).

Measures

Depression

To measure symptoms of depression, the Edinburgh Postnatal Depression Scale (EPDS) was used [51]. The EPDS is a 10-item self-report scale, with scores ranging from 0-30, and is commonly used to assess depression levels amongst pregnant and postnatal individuals [51]. Higher self-report scores indicate increased depressive symptoms, and a cut-off of ≥13 is used to indicate clinically elevated symptoms of depression [51].

Anxiety

To measure symptoms of anxiety, the Patient-Reported Outcomes Measurement Information System (PROMIS) Anxiety Adult 7-item short form was used. This self-report measure has possible t-scores ranging from 36.7 to 82.7, with higher scores indicating greater levels of anxiety. A cut-off of ≥ 60 is used to indicate clinically elevated symptoms of anxiety [52].

Prenatal care and birth plans

Participants were asked questions about experiencing changes in prenatal care, prenatal appointment cancellations, changes to birth plans (e.g., changes to birth location, inclusion of support persons, childcare arrangements, or other), and ability to bring partner or support person

to appointments. Participants were also asked to indicate which health services were difficult to access due to the pandemic (e.g., massage, chiropractic, physiotherapy, acupuncture, psychological counselling, or other). Finally, participants were asked if they felt that the quality of care had decreased and if they were concerned about self and baby not receiving necessary care. Responses on these last two items were measured on a scale from 0 – 100, with anchors being 0 = *not at all*, 50 = *somewhat*, and 100 = *very much so*.

Social support

To assess perceived social support, participants completed two questionnaires: The Social Support Effectiveness Questionnaires (SSEQ; [53]) and the Interpersonal Support Evaluation List (ISEL; [53]). The SSEQ is a 25-item questionnaire that evaluates the perceived effectiveness of support received from another person, which for this study was the pregnant individual's partner. Psychometric evaluation reveals reliability of the SSEQ with alpha (a = .87; [53]).

The ISEL is a 12-item questionnaire that evaluates general support received from a broader network, including friends and family [54]. Reliability for the ISEL has been demonstrated in a cohort of mothers from a general population, with alpha (a =.86; [55]).

Additionally, participants reported whether they regularly attended a religious, cultural, or social group that could not meet during the COVID-19 pandemic.

Coping

To explore how individuals were coping with the uncertainty and stress of being pregnant during the COVID-19 pandemic, participants were asked an open-ended question, *"People are responding to the pandemic in many ways. Can you tell us what things you are doing to cope with the COVID-19 pandemic?*"

Data Analysis

Statistical Analysis

IBM SPSS Statistics 28 was used for all statistical analysis. Survey responses were checked for incomplete or invalid responses, which were removed prior to analyses. Outliers in the data were also examined and winsorized if >3SD from the mean of the corresponding measure. This resulted in the winsorization of two PROMIS Anxiety t-score data points and one ISEL data point. Descriptive statistics (n = 336) were computed for demographic information, including geographical location, age, marital status, household income, and education. Additionally, descriptive statistics (n = 336) were computed for mental wellbeing, social support, and disruptions to prenatal care.

Hierarchical linear regression analyses (n = 260) were used to examine the impact of various predictors on anxiety (Model 1) and depression (Model 2) for pregnant Indigenous persons. Block 1 included demographic characteristics, such as age, household income, education, marital status, savings, gestation, and parity. Block 2 included social support characteristics, such as levels of general social support, partner social support, and social group attendance. Finally, Block 3 included COVID-19 related disruptions to prenatal care, such as changes in care, prenatal appointment cancellations, decrease in quality care, concern about self and baby not receiving necessary care, changes to birthing plans, trouble accessing healthcare, and ability to bring partner or support person to appointments. Approximately 23% of participants (n = 76) were missing data for one or more of the predictor variables, and these cases were handled through listwise deletion for this portion of the analyses.

Qualitative Analysis

The open-ended response question asking participants to report on the ways they were coping was analyzed qualitatively using a thematic approach. The responses to this question were exported from SPSS to NVivo where they were analyzed and coded thematically for identified themes [56]. As a first phase step, potential codes were documented based on topics from raw data. Analysis began with a deductive assessment of identifying data to fit within the codes. Subsequently, further coding was conducted inductively through the creation of codes based on emerging themes within the data [57]. Themes were exported from SPSS to a password protected file where they were summarized. One coder conducted these analyses for the qualitative data. This coder identifies as an Indigenous woman who has particular interest and experience in studies related to Indigenous family wellness.

Results

Participants in this study experienced a broad range of service disruptions due to the COVID-19 pandemic. Majority of participants (76.8%) experienced changes in prenatal care, including appointment cancellations (59.5%), with close to one-third of participants (32.1%) having made changes to their birthing plan. Specific changes included changes to birth location (11.3%), childcare arrangements (8.3%), and other unspecified changes (2.7%). Additionally, participants also reported changes to support people (25.6%), specifically, not being able to bring a support person to prenatal care appointments (84.5%). Just over half (54.8%) reported difficulties in accessing health care services such as massage (43.8%), chiropractic care (21.4%), psychological counselling (15.8%), physiotherapy (10.7%), other unspecified services (9.2%), and acupuncture (8.6%). A quarter (25%) of participants reported that religious, cultural, or social groups that they regularly attended could not meet during the pandemic. Participants also experienced high levels of psychological distress, with 40% meeting clinical cut-offs for comorbid depression and anxiety, 14% meeting cut-offs for only anxiety, and 5% meeting cut-offs for only depression. Additional sample characteristics for psychological distress, protective factors, and COVID-19 related prenatal care disruptions are noted in **Table 1**.

Table 1

Sample Characteristics for Psychological Distress, Protective Factors, and COVID-19 Related Prenatal Care Disruptions

Measure	Mean	SD	Range
Psychological Distress			
Edinburgh postnatal depression scale (EPDS)	12.77	5.26	0 – 29
PROMIS anxiety t-scores*	61.15	8.07	42.1 – 82.7
Protective Factors			
General social support*	37.42	7.33	14 – 48

Partner social support	51.21	16.92	4 – 80
Social group attendance	83 yes / 220 no / 7 n/a		
COVID-19-related Service Disruption			
Changes in prenatal care	258 yes / 45 no		
Prenatal appointment cancellations	103 yes / 200 no		
Decrease in quality care	45.69	33.07	0 – 100
Concern about self and baby not receiving necessary care	35.64	31.50	0 – 100
Changes in birth plan	108 yes / 194 no		
Trouble accessing healthcare	184 yes / 118 no		
Ability to bring partner or support person to appointments	47 yes / 256 no		

* Winsorized

Depression

Analysis of the first hierarchical linear regression model revealed that all three blocks significantly predicted levels of prenatal depression symptoms among pregnant Indigenous persons. The first block included the demographic variables of age, household income, education, marital status, household savings, gestational age, and parity. This first block accounted for 14.4% of the variance, $F(7,252) = 6.047$, $p < .001$, $f^2 = 0.17$. Increased levels of household income ($p = .004$) and savings ($p = .006$) significantly predicted decreased depression symptoms. Additionally, being married, living in a common-law relationship, or living with a partner was also a significant predictor of decreased depression symptoms ($p = .036$).

When added in the second block, general social support, partner social support, and social group attendance significantly accounted for an additional 15.9% of the variance in depression symptoms, $F(3,249) = 18.881$, $p < .001$, $f^2 = 0.23$. Overall, the second block accounted for 30.2% of the variance in depression symptoms, $F(10,249) = 10.798$, $p < .001$, $f^2 = 0.43$. Higher levels of savings continued to significantly predict decreased depression symptoms ($p = .021$). With respect to social support variables, increased general social support ($p = .006$) and partner social support ($p < .001$) were significantly predictive of decreased depression symptoms.

The third block added COVID-19-related prenatal care disruptions into the model, which accounted for an increased 6.9% of the variance, $F(7,242) = 3.809$, $p = <.001$, $f^2 = 0.11$. This block accounted for 37.2% of the variance in depression symptoms, $F(17,242) = 8.422$, $p < .001$, $f^2 = 0.59$. Increased general social support ($p = .009$) and partner social support ($p < .001$) continued to significantly predict decreased depression symptoms. Of prenatal care disruption variables, experiencing increased concerns about self and baby not receiving necessary care ($p = .022$) and having trouble in accessing healthcare ($p = .017$) significantly predicted increased depression symptoms. See **Table 2** for results of the whole model.

Table 2

Hierarchical Multiple Regression Analysis Predicting Depression Symptoms

Predictors		β	SE	t	*p*	Adjusted R^2
Block 1	Constant				<.001*	.120
	Age	-.026	.08	-.37	.713	
	Household income	-.218	.21	-2.90	.004*	
	Education	.018	.35	.26	.799	
	Marital status	-.131	1.14	-2.11	.036*	
	Savings	-.173	.29	-2.75	.006*	
	Gestation	-.015	.04	-.25	.805	
	Parity	.047	.49	.72	.470	
Block 2	Constant				<.001*	.274
	Age	-.093	.08	-1.41	.161	
	Household income	-.105	.20	-1.50	.135	
	Education	.013	.33	.19	.849	
	Marital status	-.087	1.06	-1.53	.127	
	Savings	-.134	.27	-2.32	.021*	
	Gestation	-.006	.04	-.12	.907	
	Parity	-.033	.46	-.54	.587	
	General social support	-.173	.02	-2.75	.006*	
	Partner social support	-.312	.05	-4.65	<.001*	
	Social group attendance	.073	.73	1.28	.200	
Block 3	Constant				<.001*	.328
	Age	-.079	.08	-1.22	.225	
	Household income	-.133	.20	-1.92	.056	
	Education	-.013	.32	-.20	.839	

Marital status	-.101	1.02	-1.82	.070
Savings	-.105	.26	-1.87	.063
Gestation	-.051	.04	-.95	.345
Parity	-.012	.45	-.21	.834
General social support	-.161	.02	-2.62	.009*
Partner social support	-.243	.05	-3.65	<.001*
Social group attendance	.020	.73	.35	.727
Changes in prenatal care	.003	1.17	.05	.962
Prenatal appointment cancellations	-.037	.75	-.60	.552
Decrease in quality care	-.030	.02	-.32	.751
Concern about self and baby not receiving necessary care	.207	.02	2.31	.022*
Changes in birth plan	.097	.69	1.70	.090
Trouble accessing healthcare	.136	.68	2.41	.017*
Ability to bring partner or support person to appointments	-.030	.88	-.53	.596

* $p < .05$

Anxiety

Similar to the first model, analysis of the second hierarchical linear regression model revealed that all three blocks significantly predicted levels of prenatal anxiety symptoms. The first block demonstrated that demographics accounted for 8.0% of the explained variance in anxiety symptoms, $F(7,252) = 3.110$, $p = .004$, $f^2 = 0.09$. Increased levels of household income ($p = .038$) and savings ($p = .007$) were significantly predictive of decreased anxiety symptoms. Meanwhile, education, marital status, gestation, and parity did not significantly predict anxiety symptoms.

In the second block, addition of general social support, partner social support, and social group attendance increased the explained variance in anxiety symptoms by 10.9%, $F(3,249) = 11.201$, $p < .001$, $f^2 = 0.13$. As a whole, the second block accounted for 18.9% of the variance in anxiety symptoms, $F(10,249) = 5.801$, $p < .001$, $f^2 = 0.23$. Increased levels of savings ($p = .019$) continued to be predictive of decreased anxiety symptoms. With respect to social support

variables, increased partner social support predicted lower anxiety symptoms ($p < .001$), while social group attendance and general social support were not significant predictors ($p > .05$).

The addition of COVID-19-related prenatal care service disruptions in the third block increased the explained variance in anxiety symptoms by 10.1%, $F(7,242) = 4.908$, $p < .001$, $f^2 = 0.14$. This final block was responsible for predicting 29.0% of the variance in anxiety symptoms, $F(17,242) = 5.808$, $p < .001$, $f^2 = 0.41$. Of the demographic and social support variables, only increased partner social support continued to significantly predict decreased anxiety symptoms ($p = .002$). Regarding service care disruptions, experiencing changes in birth plans ($p = .026$) and having trouble accessing healthcare ($p = .038$), significantly predicted increased anxiety symptoms. Further, experiencing increased concerns about self and baby not receiving necessary care also significantly predicted increased anxiety symptoms ($p < .001$). See **Table 3** for results of the whole model.

Table 3

Hierarchical Multiple Regression Analysis Predicting Anxiety Symptoms

Predictors		β	SE	t	*p*	Adjusted R^2
Block 1					.004*	.054
	Age	-.032	.12	-.44	.663	
	Household income	-.162	.31	-2.08	.038*	
	Education	.096	.51	1.31	.192	
	Marital status	-.065	1.67	-1.01	.315	
	Savings	-.176	.43	-2.70	.007*	
	Gestation	-.003	.06	-.04	.965	
	Parity	.055	.72	.81	.418	
Block 2					<.001	.156
	Age	-.095	.12	-1.34	.181	
	Household income	-.069	.30	-.91	.364	
	Education	.094	.50	1.29	.197	
	Marital status	-.021	1.60	-.35	.729	
	Savings	-.146	.41	-2.36	.019*	
	Gestation	.004	.05	.07	.941	
	Parity	-.007	.70	-.11	.914	

	General social support	-.086	.03	-1.27	.205	
	Partner social support	-.299	.08	-4.12	<.001*	
	Social group attendance	.086	1.11	1.40	.162	
Block 3					<.001*	.240
	Age	-.083	.12	-1.20	.231	
	Household income	-.090	.30	-1.22	.223	
	Education	.064	.48	.91	.364	
	Marital status	-.034	1.53	-.59	.559	
	Savings	-.113	.39	-1.89	.061	
	Gestation	-.046	.05	-.80	.423	
	Parity	.023	.68	.36	.718	
	General social support	-.079	.03	-1.21	.227	
	Partner social support	-.216	.08	-3.06	.002*	
	Social group attendance	.019	1.09	.32	.749	
	Changes in prenatal care	.020	1.75	.28	.780	
	Prenatal appointment cancellations	-.072	1.12	-1.10	.273	
	Decrease in quality care	-.091	.03	-.90	.371	
	Concern about self and baby not receiving necessary care	.319	.03	3.36	<.001*	
	Changes in birth plan	.135	1.04	2.24	.026*	
	Trouble accessing healthcare	.125	1.02	2.09	.038*	
	Ability to bring partner or support person to appointments	.003	1.31	.05	.964	

* $p < .05$

Coping

Approximately half of participants (n = 167) responded to the open-ended question about coping, with the majority of responses (67.5%) being between 1 to 20 words in length. Eight themes emerged: s*taying informed, physical and/or outdoor activities, passive or independent home-based activities, creative activities, social and/or cultural activities, avoidant approaches, internal mental health strategies, and struggling to cope*. Subcodes (see **Figure 1**) were developed within each theme. Results from open-ended response questions are summarized in **Table 4**.

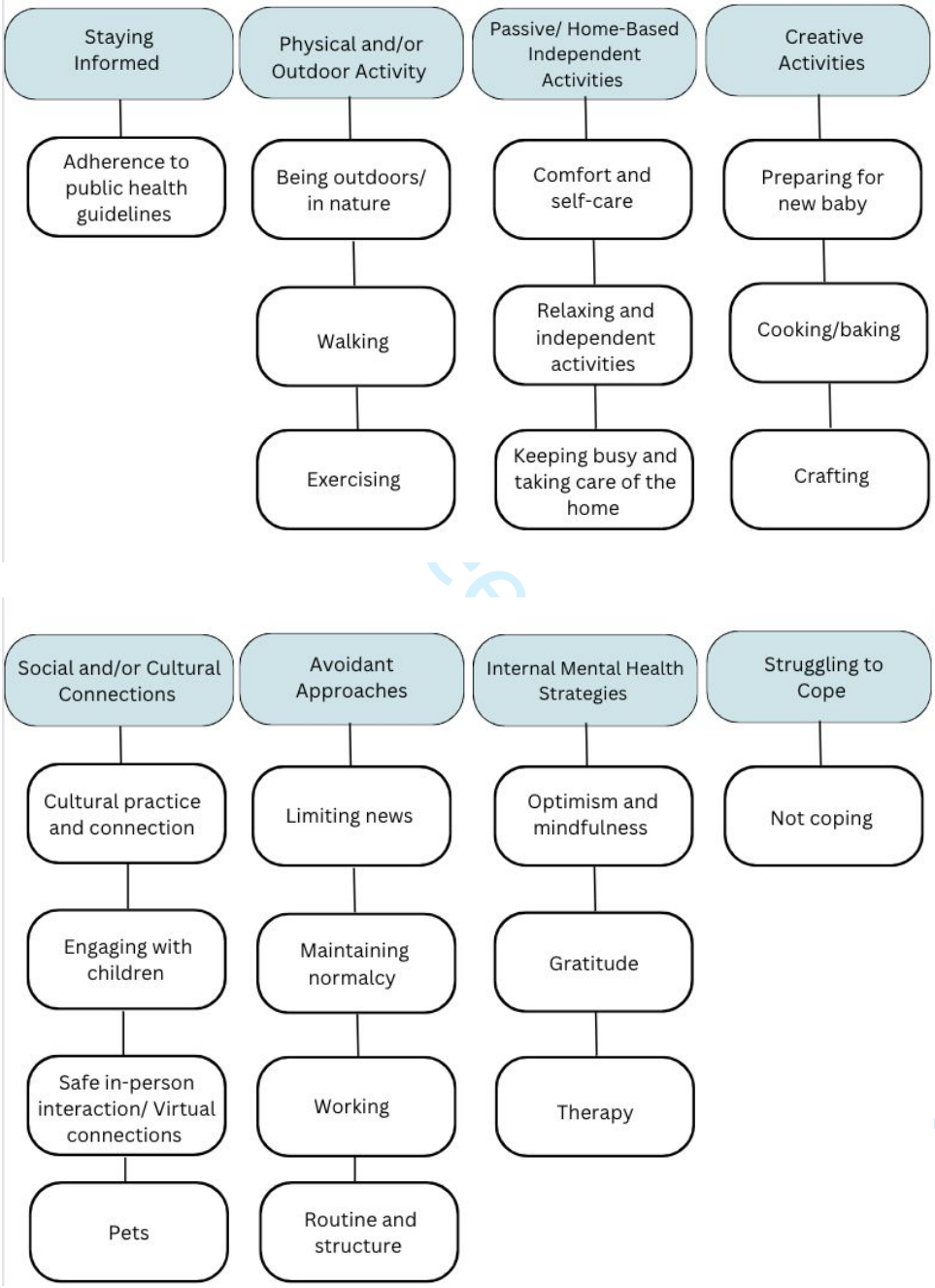
Table 4.
Coping Strategies – Qualitative Themes

Theme	Sub-Theme(s)	Overview	Quotes
Staying Informed	Adherence to public health guidelines	This theme is characterized by caution and care related to public health advisory in response to the pandemic. Staying home, handwashing, wearing a mask, social distancing and adapting daily activities such as work, shopping, and school to virtual mediums were expressed by some participants as eliciting peace of mind.	*"Using PPE, being extra cautious."* *"Following health authorities' guidelines."* *"Staying home. No friends over for the kids or any visiting friends."*
Physical and/or Outdoor Activity	Being outdoors/in nature Walking Exercising	Participants shared that spending time outdoors, in nature, and being physically active are practices that support coping through pregnancy during the pandemic. Most commonly, walking and gardening were referenced in this sample.	*"I find dealing with your head easier when you can put it all into a project with long term benefits. Food and living life are always solid go-to's for mental health, try to live in the present."* *"I have always been very active outside wilderness trips, kayaking hikes… so I've turned to gardening, making my yard beautiful getting a few chickens to focus on."*
Passive and/or Home-Based Independent Activities	Comfort and self-care Relaxing and independent activities Keeping busy and taking care of the home	Activities ranging from reading, increasing hours of rest, tackling yard work, and home cleaning, were found to be comforting by many participants. While this theme is characterized by independent activities that can be enjoyed in the home, we differentiate between those who preferred more passive activities such as bathing and napping, and those who preferred more energetic activities, such as household chores.	*"Keeping my mind occupied with television, reading or sleeping during the day."* *"Keeping the house tidy and clean which has been very satisfying."*

Creative Activities	Preparing for new baby Cooking/baking Crafting	Creative activities were shared by some participants as being beneficial additions to their coping strategies. These included making arrangements for a new baby, cooking, baking, and crafting.	*"I am finding ways to make myself more excited about the baby having a friend do weekly bump photos outside my home and making a pregnancy book."* *"Cooking nice food and getting excited about meals."*
Social and/or Cultural Activities	Cultural practice and connection Engaging with children Safe in-person interactions Virtual social connection Pets	Socializing was a key theme among participants for maintaining wellbeing through the pandemic and navigating isolation during pregnancy. Cultural values were also referenced by some. Of particular note were the challenges communities faced engaging in community connection and cultural practices due to additional barriers brought forth by the pandemic. Participants found that interacting at home with their children, pets, and partners was helpful in mitigating stress. Staying connected to extended family and friends in person when it was safe to do so, or virtually when necessary, was also noted as helpful.	*"I am taking this extra time to really learn new ways to grow and have been reaching out for support more and talking more about my struggles with family and peers. Using snapchat had helped me keep in contact with my friends and loved ones."* *"Trying to connect with the Indigenous community online."* *"Moved into my parent's house to have more help with the toddler and more socialization for all of us."*

Avoidant Approaches	Limiting news Maintaining normalcy Working Routine and structure	In contrast to those who found solace in staying informed on matters related to the pandemic, others found it more helpful to avoid news consumption and attempt to remain grounded in normalcy and routine. For example, by continuing to work and be consistent in the structure of their pre-pandemic lives, as well as those of their children, participants felt it easier to cope with circumstances of the broader environment.	*"Only watch a little news in the morning but otherwise tuning it out."* *"Keeping to my normal pre-pandemic routine as much as possible."*
Internal Mental Health Strategies	Optimism and mindfulness Gratitude Therapy	Perception-based strategies were employed by some participants in order to combat stressors arising as a result of the pandemic. These included being optimistic and mindful, finding opportunities to reflect and experience gratitude, taking life one day and a time, and attending mental health therapy sessions.	*"I lost my mom and brother the year before the pandemic. So, comparatively, perspective has been important. I had already turned 'inward' and slowed my life to accommodate my grief journey. Pandemic felt like an extension of this."* *"I've also been able to find joy in many things, and am extremely grateful to be in such a position to be able to work, help, feel financially stable, and re-connect with my family during what is globally such an uncertain time"*
Struggling to Cope	Not Coping	Some participants stated that they are not coping well, if at all. Expressions of frustration with public health regulations were also shared.	*"I am not coping well."* *"I'm not* [coping]*."* *"Beyond the things above grocery shopping, it really stresses me out. I hate all the stupid rules…"*

Figure 1
Coping Strategies Themes and subthemes



Discussion

During the COVID-19 pandemic, over half (>50%) of Indigenous pregnant individuals in our sample experienced clinically significant levels of prenatal depression and/or anxiety. Heightened levels of both depression and anxiety may have been impacted by uncertainty around the impacts of COVID-19, and time during which the data was collected, as health restrictions were high. Our results are consistent with other studies reporting increased depression and

anxiety among pregnant individuals [29,2], along with increased mental wellbeing concerns amongst Indigenous populations [10,24]. Participants reported increased service disruptions due to the COVID-19 pandemic, including restricted access to quality care and decreased quality of prenatal care, changes to birthing plans, and decreased opportunities for social support during birthing.

Healthcare service use among pregnant individuals is dependent upon several elements related to sociodemographic factors, economics, and facility logistics, including distance to and quality of health care [58]. The COVID-19 pandemic presented with unique challenges that further limited healthcare service use among pregnant individuals due to issues such as decreased access to prenatal services and concerns about contracting COVID-19 [59]. For Indigenous communities, systemic racial discrimination and inequalities in health care accessibility create further barriers in accessing quality prenatal care [10,11,24]. Previous research suggests that there are strong associations between limited access to prenatal care and psychological distress among pregnant individuals, and our results mirror these findings when examining the Indigenous pregnant population in Canada [2].

The importance of accessible quality prenatal care for both the pregnant individual and unborn baby cannot be overstated in discussions to support the psychological wellbeing of Indigenous pregnant individuals. Experiencing difficulties in access to prenatal care and having greater concerns about quality of care was significantly predictive of both prenatal depression and anxiety symptoms. Additionally, experiencing changes in birthing plans was significantly predictive of prenatal anxiety. Pregnancy care service quality and accessibility issues along with changes in birth plan are linked to depressive and anxiety-based symptoms across multiple studies [60,61,62,63]. Discomfort with novel healthcare processes, such as virtual or telehealth appointments, and overlapping stress from experiencing a pregnancy during a global health pandemic may have further impacted self-reported levels of depression and anxiety. As pregnancies can be a time of heightened stress levels, uncertainties about accessing and quality of prenatal care are likely to impact mental wellbeing [64,65,66].

These findings are aligned with others that have emerged in the literature regarding pregnancy during the pandemic with anxiety, depression, and healthcare challenges noted consistently [67,22,68,69]. Theoretical foundations to support these findings can be seen in Maslow's classic conceptualization of the Hierarchy of Needs (1943) where it is said that certain needs must be addressed prior to others. Specifically, physiological needs are posited to be of primary importance and said to be critical to address first, in order to then consider other needs. In this study, participants' disclosures of distress related to issues with basic healthcare reflects the imperative nature of caring for such fundamental needs. In addition to health inequities, Indigenous peoples also face socioeconomic disparities [71] which create further barriers in accessing health care and is consistent with policies to reduce poverty related stress [72]. The impacts of colonization and generational wealth policies systematically create barriers for the wellness of pregnant Indigenous individuals. Due to the recruitment methodology of the larger Pregnancy During the COVID-19 Pandemic study, the sample generally skews towards higher socioeconomic status, thus, we may expect the importance of financial security to be more relevant in a more representative sample.

In addition to prenatal care, findings of this study also suggest the notable influence of social support on the wellbeing of pregnant Indigenous persons. Increased partner social support was predictive of decreased levels of depression and anxiety, while increased general social support was predictive of decreased levels of depression only. Similar findings were reported in the larger *Pregnancy during the Pandemic* sample by Lebel and colleagues (2020), which found that both partner and general social support predicted reduced levels of anxiety and depression in pregnant individuals. These findings mirror previous literature in the field, which demonstrates significant associations between social support and mental wellbeing concerns among pregnant individuals broadly [73,74,75], and among Indigenous pregnant individuals [32]. The emergence of partner social support as the most significant predictor for prenatal anxiety and depression in comparison to other levels of social support (i.e., general social support and social group attendance) is expected. At the height of the COVID-19 pandemic, numerous public health measures, such as mandatory lockdowns and social distancing, were introduced to limit transmission of the virus. For many individuals, these changes inadvertently affected access to social support systems outside the home, thereby increasing reliance on such systems within the home [76]. The COVID-19 Family Disruption Model [76] highlights the importance of these relationships and social support systems in maintaining wellbeing during periods of heightened stress. For pregnant individuals, the significant association between prenatal mental wellbeing and partner social support during the COVID-19 pandemic [77,78,22] presents partner support as a modifiable protective factor to enhance prenatal wellbeing.

In alignment with our objective to understand coping strategies, qualitative results reveal various approaches to coping with stressors as arisen through experiencing a pregnancy during a global health pandemic. These include strategies such as staying informed on the progression of the pandemic and public health guidelines, engaging in physical and/or outdoor activity, engaging in home-based and/or other independent activities, engaging in creative activities, engaging in social and cultural activities with family, developing mental wellbeing strategies and routines, (e.g., meditation, practicing gratitude, therapy) and attempting to avoid the pandemic reality (e.g., limiting news consumption). This is consistent with extant literature on coping mechanisms related to avoidance-based activities, connection driven activities, and alignment with recommendations for safety from public health governing bodies [41,42,43]. Some participants expressed struggles to cope or a perceived lack of coping entirely. Struggling to cope has been a consistent experience across pregnant individuals during the pandemic with shifting availability of pre-pandemic coping strategies and a substantial deviation from normalcy [79].

In Canada specifically, pregnant individuals during the pandemic were found to have increased rates of depression and anxiety as amplified by financial strain, social isolation, risk of contracting the COVID-19 infection, and relationship difficulties, which were buffered by social support [80,34]. With Indigenous persons in Canada, we expect to see increased levels of distress due to disproportionate negative mental wellbeing experiences observed within that demographic [81,44,45]. This is exacerbated through neglectful and harmful interactions with healthcare systems [82]. It is important to acknowledge the resilience developed among Indigenous parents who continue to engage in support service-oriented research despite negative past and ongoing experiences throughout their pursuit of care in the perinatal period. Respondents in this study reported strengths with social and partner support and the use of various coping strategies which appear to add to resilience factors.

According to Lazarus and Folkman Transactional Theory of Stress and Coping (TTSC) (1984) individuals interact with stress in a transactional exchange with their environment. Coping that ensues is said to be categorized based on problem focused and emotion focused strategies. Active coping aimed at addressing a given stressor is characteristic of a problem focused approach, whereas passive and avoidance-based coping is often representative of emotion focused strategies. Given that addressing the 'problem' at the root of the stressor in this circumstance, namely the COVID-19 virus, was largely outside of participants' control, active coping was seen in this sample through adherence to public health guidelines and taking steps to engage in health promoting activities such as being physically active and spending time outdoors. Additionally, avoidance-oriented coping was also noted in this sample, such as limited new consumption. Therefore, in keeping with the TTSC, both problem and emotion focused coping strategies are exemplified in our findings.

The Breath of Life Theory, coined by Blackstock (2011), has been proposed as a critical framework for understanding relational elements of wellbeing and culturally centred understanding of needs for Indigenous, specifically First Nations, people. Our findings related to coping and social support provide evidence to support this in the present study, as these factors revealed connection to spiritual and cultural practice as well as social connection were vital supports in the face challenges imposed by the pandemic provide evidence to support this in the present study.

Limitations

Recruitment relying primarily on social media potentially reduced the number of participants that may have otherwise been recruited with a broader reach through other means. This may have also inflated the socioeconomic status of the sample due to the need for participants to have access to technology and social media. Therefore, our sample demographics reported household income as greater than the median for Canadian families in 2019 [85], which does not accurately reflect median incomes for Indigenous populations [86]. Further, research practices have been historically harmful when conducted with Indigenous populations [87,88,72]. This has led to mistrust of research groups and practices among Indigenous peoples and, consequently, may have impeded the participation of some Indigenous pregnant persons in this study. Finally, due to the heterogeneity of Indigenous communities, these findings may not be generalizable across all Indigenous Nations and individuals, as values and beliefs held by one Nation or individual are not necessarily reflective of all. Accordingly, caution must be exercised in interpreting these results to not erroneously assume pan-Indigeneity of perspectives shared and conclusions drawn herein. Lastly, anxiety and depression symptom scores were based on self-report scores and not clinical diagnoses.

Implications and Future Directions

These results carry important implications for the information of pregnant Indigenous persons through the illustration of challenges in accessibility of care and changes in prenatal care resulting from the pandemic. Healthcare providers may benefit from findings produced through this study to inform change aimed at adequately accommodating the healthcare related needs of Canadian Indigenous peoples experiencing a pregnancy. As part of the greater longitudinal objectives, future research will continue to track mental wellbeing of individuals who were

pregnant during the pandemic and examine child wellbeing outcomes. Postpartum care will be studied to understand the extent to which services are improved or hindered as the pandemic progresses.

Service disruptions and/or low qualitive prenatal care is a serious issue which exacerbates systemic inequities and contributes to poor mental wellbeing [12,24]. Social support, including partners and social groups, seems to be a protective factor for pregnant individuals. Enhancing the efficacy of policies and programming surrounding prenatal care to increase accessibility and incorporate protective factors can increase quality of care. Further research in this area is warranted to understand the impact of COVID-19 on pregnant individuals, as exemplified by the following open-text response received from one of our participants:

> *"I appreciate your researchers looking into this as for some time when the pandemic started, I felt invisible as a pregnant person as no one was paying attention to us so this makes me feel really good that as a group we are being considered. Thank you for your work."*

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Original Research: Mixed Methods Study Exploring Health Service Access and Social Support Linkage to the Mental Wellbeing of Canadian Indigenous Pregnant Persons during the COVID-19 Pandemic

Meghan O. Mollons[1], Sydney Levasseur-Puhach[1], Jasleen Kaur[2], Jennifer Doyle[3], Gerald Giesbrecht[4,5], Catherine Lebel[6], Lindsay Woods[7], Lianne Tomfohr-Madsen*[3], Leslie E. Roos*[1,8,9]

[1]Department of Psychology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N
[2] Department of Psychology, University of Calgary, Calgary, Alberta, Canada, T2N 1N4
[3] Department of Educational and Counselling Psychology, and Special Education, University of British Columbia, Vancouver, British Columbia, V6T 1Z4
[4] Departments of Pediatrics and Community Health Sciences, University of Calgary, Calgary, Alberta, Canada, T2N 1N4
[5] Owerko Center at the Alberta Children's Hospital Research Institute, Calgary, Alberta, Canada, T2N 1N4
[6] Department of Radiology, Alberta Children's Hospital Research Institute, University of Calgary, Calgary, Alberta, Canada, T2N 1N4
[7] New Directions, Winnipeg, Manitoba, Canada, R3G 0M8
[8] Children's Hospital Research Institute of Manitoba, Winnipeg, Manitoba, Canada, R3E 3P4
[9] Rady Faculty of Health Sciences, University of Manitoba, Winnipeg, Manitoba, Canada, R3E 0W2

*co-senior authorship

Corresponding author: Meghan O. Mollons; University of Manitoba; mollonsm@myumanitoba.ca

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ABSTRACT

Objectives to explore how the unprecedented stressors associated with the COVID-19 pandemic may have contributed to heightened levels of depression and anxiety amongst pregnant Indigenous persons and identify protective individual-level factors.
Design The current study used a mixed-methods design including standardized questionnaires and open-ended response questions. Using hierarchical regression models, we examined the extent to which COVID-related factors of service disruption (i.e., changes to prenatal care, changes to birth plans, and social support) were associated with mental wellbeing. Further, through qualitative analyses on open-ended coping questions, we examined the coping strategies utilized by pregnant Indigenous persons in response to the pandemic.
Setting Participants responded to an online questionnaire consisting of standardized measures from 2020-2021.
Participants The study included 336 self-identifying Indigenous pregnant persons in Canada
Results Descriptive results revealed elevated rates of clinically relevant depression (52.7%) and anxiety (62.5%) symptoms among this population. 76.8% of participants reported prenatal care service disruptions, including appointment cancellations. Thematic analyses identified coping themes of staying informed, social and/or cultural connections and activities, and internal mental wellbeing strategies. Disruptions to services and decreased quality of prenatal care negatively impacted mental wellbeing of Indigenous persons during the COVID-19 pandemic.
Conclusions Given the potential for mental wellbeing challenges to persist, and long-term effects of perinatal distress, it is important to examine the quality of care that pregnant individuals receive. Service providers should advance policies and practices that promote relationship quality and health system engagement as key factors linked to wellbeing during the perinatal period, for Indigenous persons.

Keywords: Prenatal care, Indigenous health, Indigenous pregnancy, service provision, COVID-19

Strengths and limitations of this study:

- This study includes important implications for the perinatal healthcare access and service provisions for Indigenous persons in Canada.
- The findings from this study discuss the resiliency and coping strategies utilized by Indigenous persons in Canada to counter barriers in the healthcare system during the height of the COVID-19 pandemic.
- The participant sample largely consists of participants with a higher than Canadian average median income, which may limit the transferability of findings to the larger population.
- This study lacked the incorporation of traditional birthing and healing practices when assessing healthcare service usage for Indigenous pregnant persons.

Supportive and ongoing prenatal care is vital to optimize pregnancy outcomes [1,2,3], with regular and secure access to high-quality prenatal care supporting the mental and physical health of the pregnant person, thereby increasing the likelihood of birthing a healthy child [4,5]. By providing education, counselling, and emotional support, prenatal care can help pregnant people maintain their overall well-being and promote positive outcomes [5]. Establishing a long-term relationship with care providers also ensures consistent and coordinated care, builds trust and improves communication, allows for more personalized care, and promotes positive health outcomes for the birthing parent and baby [6,7].

The COVID-19 pandemic brought widespread health restrictions, limiting people's access to health care practitioners and services, including prenatal care [8,9]. Pandemic related stressors, including service restrictions, have been associated with an increase in emotional distress in individuals experiencing pregnancies [10]. Due to the historical and ongoing impacts of colonialism, Indigenous Peoples of Canada already experience tremendous health inequities, including restricted access to healthcare [11,12]. Access to pregnancy- specific healthcare services is also impacted by issues such as cultural misalignment, distance to services, cost, lack of transport, and lack of awareness of available services [13,14]. Additionally concerning are the ways in which distrust of systems of support and systemic racism can impede access to care. In Canada, a deficit-based discourse around Indigenous health has contributed to stigmatization, discrimination, and marginalization of Indigenous Peoples' [15, 16]. Consequently, this leads to a lack of trust in the healthcare system, making pregnant Indigenous persons less likely to seek care [17].

As a result of the COVID-19 pandemic, prenatal care was restricted across Canada, with some individuals experiencing limited or complete loss of access to their primary health care providers, obstetricians, and/or midwives, and limited social support during their pregnancies [18,2]. A lack of a culturally aligned pandemic response, created additional barriers for pregnancy Indigenous persons [19]. Smylie and colleagues (2021) found that even pre-pandemic, Indigenous peoples had to travel away from their home communities more often for prenatal care, particularly birthing, highlighting disparities in care accessibility. Coupled with a lack of social support and ongoing systemic racism, this resulted in increased stress levels for pregnant Indigenous persons [20].

Mental Wellbeing in the Prenatal period

Pregnancy is a time of major change for individuals, both physically and psychologically, and is often associated with increased feelings of stress [21,22]. Substantial research has demonstrated heightened levels of prenatal depression and anxiety experienced during the COVID-19 pandemic compared to pre-pandemic [23,24,25,26,27]. Pregnant individuals with specific sociodemographic factors, such as decreased income and lower education levels, are more vulnerable to adverse mental wellbeing symptoms during pregnancy [28,29,30]. Canadian Indigenous populations are at a particular disadvantage in this regard [31] due to the economic disadvantages they experience as a result of continuing legacies of colonialism [11]. Across Canada, approximately one-in-five Indigenous persons live in poverty and one-in-six experience difficulties with their current form of housing [32]. In addition to these economic disparities, Indigenous persons are also between one-and-a-half to five times as likely to experience trauma-inducing experiences such as childhood abuse and intimate partner violence [33]. Maintaining positive mental wellbeing and low stress levels can have positive health outcomes for both the pregnant individual and their developing baby [22]. This can prove difficult for Indigenous

communities who already face barriers in accessing proper prenatal care and mental wellbeing support [34,26].

Service Disruptions

Adequate and accessible service provisions are vital to the health and wellbeing of pregnant persons. Groulx and colleagues (2021) noted that service disruptions increased mental wellbeing concerns among Canadian pregnant individuals. While social distancing and virtual doctor appointments have been the primary alternative for health services in Canada [35, 36], this requires individuals to have adequate housing, reliable internet access, and access to electronic devices, most of which is not easily accessible to a large portion of the population, particularly in many Indigenous communities [37] which face significantly more barriers in accessing medical care, specifically prenatal care, than non-Indigenous populations, [38, 26], including forced travel from home communities to larger cities to give birth. This further restricts social support availability and access to adequate health care [26]. Long-distance travel for birthing has increased during the COVID-19 pandemic as obstetrical and health services were closed [26]. Indigenous persons who are pregnant face poorer birth outcomes, including higher rates of low-birthweight, preterm birth, and stillbirth [38,39], related to the racial disparities in access to and quality of prenatal care [40].

Social Support

The World Health Organization (2015) reports that community support and engagement is largely impactful to positive outcomes among pregnant people. Social support, specifically partner support, has been cited as a resiliency factor for pregnant individuals, particularly those with high-risk pregnancies [41,42,26]. Social support during the prenatal period can mitigate adverse mental wellbeing outcomes for pregnant individuals, and subsequently, developmental outcomes for their babies, such as low birthweight [41,22,36]. However, due to the COVID-19 pandemic, support persons were frequently not allowed to join doctor appointments or had limited involvement in the birthing process, adding to the stress levels of pregnant individuals [2,26].

Coping Strategies

Commonly used coping strategies for pregnant people during the pandemic include avoidance, connection with spirituality, and preparation [43,44,45]. For Indigenous persons specifically, perinatal stress can be experienced at a greater intensity than in other demographics [46,47]. However, reported coping strategies in the literature generally focus on substance use as a coping method, in the context of pregnant Indigenous persons [48,49,50,51].

Current Study

There is limited knowledge on the impacts of prenatal service disruption due to the COVID-19 pandemic on pregnant Indigenous persons, and how changes to birth plans and support levels have impacted the mental wellbeing of individuals pregnant during the COVID-19 pandemic. The objectives of the present study were to (1) examine mental wellbeing (i.e., anxiety and depression symptoms) among a sample of pregnant Indigenous persons during the COVID-19 pandemic, (2) to examine the associations of pandemic related service disruptions (i.e., changes to prenatal care, changes to birth plans) and social support with mental wellbeing, and (3) to generate knowledge on Indigenous pregnant peoples self-described coping strategies,

as they relate to the mental wellbeing of this population. This mixed-methods study aims to further develop an understanding of both adaptive and maladaptive coping strategies used among Indigenous pregnant persons throughout the pandemic. Obtaining this information may be done most appropriately using a qualitative approach based on literature suggesting that these methods are most ethically aligned with culturally safe research practices [52].

Methods

Participants

The current study reports data collected from the Pregnancy During the COVID-19 Pandemic study [2], an ongoing longitudinal study examining the health impacts of the COVID-19 pandemic on pregnant individuals and their children. Participants were recruited from April 2020-2021 through online recruitment methods, including social media posts and ads on Facebook, Instagram, and Twitter. Participants were invited to join the study if they met the inclusion criteria of: residing in Canada, having the ability to read and write in English and/or French, and having a confirmed pregnancy <35 weeks gestation [35]. Participant consent was collected through Research Electronic Data Capture (REDCap) where participants signed the electronic consent to answer questionnaires and open-ended response questions. This study was approved by the University of Calgary Conjoint Health Research Ethics Board (REB20-0500).

For the purpose of this study, data include only participants who self-identified as Indigenous (First Nations, Métis, Inuit) or mixed Indigenous descent. Out of the larger sample (*N* = 10,669), 336 individuals self-identified as Indigenous; 45.2% self-identified as Métis, 42.6% self-identified as First Nations, 11.3% self-identified as mixed Indigenous ancestry, and 0.9% self-identified as Inuit. Participants were located in Quebec (25.3%), Ontario (18.8%), Alberta (18.2%), British Columbia (13.7%), Manitoba (11.0%), Saskatchewan (6.8%), Nova Scotia (3.3%), Northwest Territories (1.2%), Yukon (1.2%), and Newfoundland and Labrador (0.6%). On average, participants were 30.33 ± 5.0 years old. Most participants were married or living with a common law partner (86.9%), had completed community college, an equivalent trade or vocational degree, or greater (77.7%), and had an annual household income greater than $70,000 CAD (57.8%).

Patient and Public Involvement

The public was not involved in the design, reporting and dissemination of our study.

Measures

Depression

To measure symptoms of depression, the Edinburgh Postnatal Depression Scale (EPDS) was used [53]. The EPDS is a 10-item self-report scale, with scores ranging from 0-30, and is commonly used to assess depression levels amongst pregnant and postnatal individuals [53]. Higher self-report scores indicate increased depressive symptoms, and a cut-off of ≥13 is used to indicate clinically elevated symptoms of depression [53].

Anxiety

To measure symptoms of anxiety, the Patient-Reported Outcomes Measurement Information System (PROMIS) Anxiety Adult 7-item short form was used. This self-report measure has possible t-scores ranging from 36.7 to 82.7, with higher scores indicating greater

levels of anxiety. A cut-off of ≥ 60 is used to indicate clinically elevated symptoms of anxiety [54].

Prenatal care and birth plans

Participants were asked questions about experiencing changes in prenatal care, prenatal appointment cancellations, changes to birth plans (e.g., changes to birth location, inclusion of support persons, childcare arrangements, or other). Home births were not differentiated within changes to birth plans.The ability to bring a partner or support person to appointments was also considered. Participants were also asked to indicate which health services were difficult to access due to the pandemic (e.g., massage, chiropractic, physiotherapy, acupuncture, psychological counselling, or other). Finally, participants were asked if they felt that the quality of care had decreased and if they were concerned about self and baby not receiving necessary care. Responses on these last two items were measured on a scale from 0 – 100, with anchors being 0 = *not at all*, 50 = *somewhat*, and 100 = *very much so*.

Social support

To assess perceived social support, participants completed two questionnaires: The Social Support Effectiveness Questionnaires (SSEQ; [55]) and the Interpersonal Support Evaluation List (ISEL; [55]). The SSEQ is a 25-item questionnaire that evaluates the perceived effectiveness of support received from another person, which for this study was the pregnant individual's partner. Psychometric evaluation reveals reliability of the SSEQ with alpha (a = .87; [55]).

The ISEL is a 12-item questionnaire that evaluates general support received from a broader network, including friends and family [56]. Reliability for the ISEL has been demonstrated in a cohort of mothers from a general population, with alpha (a =.86; [57]).

Additionally, participants reported whether they regularly attended a religious, cultural, or social group that could not meet during the COVID-19 pandemic.

Coping

To explore how individuals were coping with the uncertainty and stress of being pregnant during the COVID-19 pandemic, participants were asked an open-ended question, *"People are responding to the pandemic in many ways. Can you tell us what things you are doing to cope with the COVID-19 pandemic?*"

Data Analysis

Statistical Analysis

IBM SPSS Statistics 28 was used for all statistical analysis. Survey responses were checked for incomplete or invalid responses, which were removed prior to analyses. Outliers in the data were also examined and winsorized if >3SD from the mean of the corresponding measure. This resulted in the winsorization of two PROMIS Anxiety t-score data points and one ISEL data point. Descriptive statistics (n = 336) were computed for demographic information, including geographical location, age, marital status, household income, and education. Additionally, descriptive statistics (n = 336) were computed for mental wellbeing, social support, and disruptions to prenatal care.

Hierarchical linear regression analyses (n = 260) were used to examine the impact of various predictors on anxiety (Model 1) and depression (Model 2) for pregnant Indigenous persons. Block 1 included demographic characteristics, such as age, household income,

education, marital status, savings, gestation, and parity. Block 2 included social support characteristics, such as levels of general social support, partner social support, and social group attendance. Finally, Block 3 included COVID-19 related disruptions to prenatal care, such as changes in care, prenatal appointment cancellations, decrease in quality care, concern about self and baby not receiving necessary care, changes to birthing plans, trouble accessing healthcare, and ability to bring partner or support person to appointments. Approximately 23% of participants (n = 76) were missing data for one or more of the predictor variables, and these cases were handled through listwise deletion for this portion of the analyses.

Qualitative Analysis

The open-ended response question asking participants to report on the ways they were coping was analyzed qualitatively using a thematic approach. The responses to this question were exported from SPSS to NVivo where they were analyzed and coded thematically for identified themes [58]. As a first phase step, potential codes were documented based on topics from raw data. Analysis began with a deductive assessment of identifying data to fit within the codes. Subsequently, further coding was conducted inductively through the creation of codes based on emerging themes within the data [59]. Themes were exported from SPSS to a password protected file where they were summarized. Due to language constraints resulting form the collection of qualitative responses in both French and English, and time constraints, one coder conducted these analyses for the qualitative data. This coder identifies as an Indigenous woman who has particular interest and experience in studies related to Indigenous family wellness.

Results

Participants in this study experienced a broad range of service disruptions due to the COVID-19 pandemic. Majority of participants (76.8%) experienced changes in prenatal care, including appointment cancellations (59.5%), with close to one-third of participants (32.1%) having made changes to their birthing plan. Specific changes included changes to birth location (11.3%), childcare arrangements (8.3%), and other unspecified changes (2.7%). Additionally, participants also reported changes to support people (25.6%), specifically, not being able to bring a support person to prenatal care appointments (84.5%). Just over half (54.8%) reported difficulties in accessing health care services such as massage (43.8%), chiropractic care (21.4%), psychological counselling (15.8%), physiotherapy (10.7%), other unspecified services (9.2%), and acupuncture (8.6%). A quarter (25%) of participants reported that religious, cultural, or social groups that they regularly attended could not meet during the pandemic. Participants also experienced high levels of psychological distress, with 40% meeting clinical cut-offs for comorbid depression and anxiety, 14% meeting cut-offs for only anxiety, and 5% meeting cut-offs for only depression. Additional sample characteristics for psychological distress, protective factors, and COVID-19 related prenatal care disruptions are noted in **Table 1**.

Table 1

Sample Characteristics for Psychological Distress, Protective Factors, and COVID-19 Related Prenatal Care Disruptions

Measure	Mean	SD	Range

Psychological Distress			
Edinburgh postnatal depression scale (EPDS)	12.77	5.26	0 – 29
PROMIS anxiety t-scores*	61.15	8.07	42.1 – 82.7
Protective Factors			
General social support*	37.42	7.33	14 – 48
Partner social support	51.21	16.92	4 – 80
Social group attendance	83 yes / 220 no / 7 n/a		
COVID-19-related Service Disruption			
Changes in prenatal care	258 yes / 45 no		
Prenatal appointment cancellations	103 yes / 200 no		
Decrease in quality care	45.69	33.07	0 – 100
Concern about self and baby not receiving necessary care	35.64	31.50	0 – 100
Changes in birth plan	108 yes / 194 no		
Trouble accessing healthcare	184 yes / 118 no		
Ability to bring partner or support person to appointments	47 yes / 256 no		

* Winsorized

Depression

Analysis of the first hierarchical linear regression model revealed that all three blocks significantly predicted levels of prenatal depression symptoms among pregnant Indigenous persons. The first block included the demographic variables of age, household income, education, marital status, household savings, gestational age, and parity. This first block accounted for 14.4% of the variance, $F(7,252) = 6.047$, $p < .001$, $f^2 = 0.17$. Increased levels of household income ($p = .004$) and savings ($p = .006$) significantly predicted decreased depression symptoms. Additionally, being married, living in a common-law relationship, or living with a partner was also a significant predictor of decreased depression symptoms ($p = .036$).

When added in the second block, general social support, partner social support, and social group attendance significantly accounted for an additional 15.9% of the variance in depression symptoms, $F(3,249) = 18.881$, $p < .001$, $f^2 = 0.23$. Overall, the second block accounted for 30.2% of the variance in depression symptoms, $F(10,249) = 10.798$, $p < .001$, $f^2 = 0.43$. Higher levels of savings continued to significantly predict decreased depression symptoms ($p = .021$).

With respect to social support variables, increased general social support (p = .006) and partner social support (p < .001) were significantly predictive of decreased depression symptoms.

The third block added COVID-19-related prenatal care disruptions into the model, which accounted for an increased 6.9% of the variance, $F(7,242) = 3.809$, $p = <.001$, $f^2 = 0.11$. This block accounted for 37.2% of the variance in depression symptoms, $F(17,242) = 8.422$, $p < .001$, $f^2 = 0.59$. Increased general social support (p = .009) and partner social support (p < .001) continued to significantly predict decreased depression symptoms. Of prenatal care disruption variables, experiencing increased concerns about self and baby not receiving necessary care (p = .022) and having trouble in accessing healthcare (p = .017) significantly predicted increased depression symptoms. See **Table 2** for results of the whole model.

Table 2

Hierarchical Multiple Regression Analysis Predicting Depression Symptoms

Predictors		β	SE	t	*p*	Adjusted R^2
Block 1	Constant				<.001*	.120
	Age	-.026	.08	-.37	.713	
	Household income	-.218	.21	-2.90	.004*	
	Education	.018	.35	.26	.799	
	Marital status	-.131	1.14	-2.11	.036*	
	Savings	-.173	.29	-2.75	.006*	
	Gestation	-.015	.04	-.25	.805	
	Parity	.047	.49	.72	.470	
Block 2	Constant				<.001*	.274
	Age	-.093	.08	-1.41	.161	
	Household income	-.105	.20	-1.50	.135	
	Education	.013	.33	.19	.849	
	Marital status	-.087	1.06	-1.53	.127	
	Savings	-.134	.27	-2.32	.021*	
	Gestation	-.006	.04	-.12	.907	
	Parity	-.033	.46	-.54	.587	
	General social support	-.173	.02	-2.75	.006*	
	Partner social support	-.312	.05	-4.65	<.001*	

	Social group attendance	.073	.73	1.28	.200	
Block 3	Constant				<.001*	.328
	Age	-.079	.08	-1.22	.225	
	Household income	-.133	.20	-1.92	.056	
	Education	-.013	.32	-.20	.839	
	Marital status	-.101	1.02	-1.82	.070	
	Savings	-.105	.26	-1.87	.063	
	Gestation	-.051	.04	-.95	.345	
	Parity	-.012	.45	-.21	.834	
	General social support	-.161	.02	-2.62	.009*	
	Partner social support	-.243	.05	-3.65	<.001*	
	Social group attendance	.020	.73	.35	.727	
	Changes in prenatal care	.003	1.17	.05	.962	
	Prenatal appointment cancellations	-.037	.75	-.60	.552	
	Decrease in quality care	-.030	.02	-.32	.751	
	Concern about self and baby not receiving necessary care	.207	.02	2.31	.022*	
	Changes in birth plan	.097	.69	1.70	.090	
	Trouble accessing healthcare	.136	.68	2.41	.017*	
	Ability to bring partner or support person to appointments	-.030	.88	-.53	.596	

* $p < .05$

Anxiety

Similar to the first model, analysis of the second hierarchical linear regression model revealed that all three blocks significantly predicted levels of prenatal anxiety symptoms. The first block demonstrated that demographics accounted for 8.0% of the explained variance in anxiety symptoms, $F(7,252) = 3.110$, $p = .004$, $f^2 = 0.09$. Increased levels of household income

(p = .038) and savings (p = .007) were significantly predictive of decreased anxiety symptoms. Meanwhile, education, marital status, gestation, and parity did not significantly predict anxiety symptoms.

In the second block, addition of general social support, partner social support, and social group attendance increased the explained variance in anxiety symptoms by 10.9%, $F(3,249) = 11.201$, $p < .001$, $f^2 = 0.13$. As a whole, the second block accounted for 18.9% of the variance in anxiety symptoms, $F(10,249) = 5.801$, $p < .001$, $f^2 = 0.23$. Increased levels of savings (p = .019) continued to be predictive of decreased anxiety symptoms. With respect to social support variables, increased partner social support predicted lower anxiety symptoms ($p < .001$), while social group attendance and general social support were not significant predictors ($p > .05$).

The addition of COVID-19-related prenatal care service disruptions in the third block increased the explained variance in anxiety symptoms by 10.1%, $F(7,242) = 4.908$, $p < .001$, $f^2 = 0.14$. This final block was responsible for predicting 29.0% of the variance in anxiety symptoms, $F(17,242) = 5.808$, $p < .001$, $f^2 = 0.41$. Of the demographic and social support variables, only increased partner social support continued to significantly predict decreased anxiety symptoms (p = .002). Regarding service care disruptions, experiencing changes in birth plans (p = .026) and having trouble accessing healthcare (p = .038), significantly predicted increased anxiety symptoms. Further, experiencing increased concerns about self and baby not receiving necessary care also significantly predicted increased anxiety symptoms ($p < .001$). See **Table 3** for results of the whole model.

Table 3

Hierarchical Multiple Regression Analysis Predicting Anxiety Symptoms

Predictors		β	SE	t	p	Adjusted R^2
Block 1					.004*	.054
	Age	-.032	.12	-.44	.663	
	Household income	-.162	.31	-2.08	.038*	
	Education	.096	.51	1.31	.192	
	Marital status	-.065	1.67	-1.01	.315	
	Savings	-.176	.43	-2.70	.007*	
	Gestation	-.003	.06	-.04	.965	
	Parity	.055	.72	.81	.418	
Block 2					<.001	.156
	Age	-.095	.12	-1.34	.181	
	Household income	-.069	.30	-.91	.364	
	Education	.094	.50	1.29	.197	

	Marital status	-.021	1.60	-.35	.729	
	Savings	-.146	.41	-2.36	.019*	
	Gestation	.004	.05	.07	.941	
	Parity	-.007	.70	-.11	.914	
	General social support	-.086	.03	-1.27	.205	
	Partner social support	-.299	.08	-4.12	<.001*	
	Social group attendance	.086	1.11	1.40	.162	
Block 3					<.001*	.240
	Age	-.083	.12	-1.20	.231	
	Household income	-.090	.30	-1.22	.223	
	Education	.064	.48	.91	.364	
	Marital status	-.034	1.53	-.59	.559	
	Savings	-.113	.39	-1.89	.061	
	Gestation	-.046	.05	-.80	.423	
	Parity	.023	.68	.36	.718	
	General social support	-.079	.03	-1.21	.227	
	Partner social support	-.216	.08	-3.06	.002*	
	Social group attendance	.019	1.09	.32	.749	
	Changes in prenatal care	.020	1.75	.28	.780	
	Prenatal appointment cancellations	-.072	1.12	-1.10	.273	
	Decrease in quality care	-.091	.03	-.90	.371	
	Concern about self and baby not receiving necessary care	.319	.03	3.36	<.001*	
	Changes in birth plan	.135	1.04	2.24	.026*	

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Trouble accessing healthcare	.125	1.02	2.09	.038*
Ability to bring partner or support person to appointments	.003	1.31	.05	.964

* $p < .05$

Coping

Approximately half of participants (n = 167) responded to the open-ended question about coping, with the majority of responses (67.5%) being between 1 to 20 words in length. Eight themes emerged: s*taying informed, physical and/or outdoor activities, passive or independent home-based activities, creative activities, social and/or cultural activities, avoidant approaches, internal mental health strategies, and struggling to cope*. Subcodes (see **Figure 1**) were developed within each theme. Results from open-ended response questions are summarized in **Table 4**.

Table 4.
Coping Strategies – Qualitative Themes

Theme	Sub-Theme(s)	Overview	Quotes
Staying Informed	Adherence to public health guidelines	This theme is characterized by caution and care related to public health advisory in response to the pandemic. Staying home, handwashing, wearing a mask, social distancing and adapting daily activities such as work, shopping, and school to virtual mediums were expressed by some participants as eliciting peace of mind.	*"Using PPE, being extra cautious."* *"Following health authorities' guidelines."* *"Staying home. No friends over for the kids or any visiting friends."*
Physical and/or Outdoor Activity	Being outdoors/in nature Walking Exercising	Participants shared that spending time outdoors, in nature, and being physically active are practices that support coping through pregnancy during the pandemic. Most commonly, walking and gardening were referenced in this sample.	*"I find dealing with your head easier when you can put it all into a project with long term benefits. Food and living life are always solid go-to's for mental health, try to live in the present."* *"I have always been very active outside wilderness trips, kayaking hikes… so I've turned to gardening, making my yard beautiful getting a few chickens to focus on."*
Passive and/or Home-Based Independent Activities	Comfort and self-care Relaxing and independent activities Keeping busy and taking care of the home	Activities ranging from reading, increasing hours of rest, tackling yard work, and home cleaning, were found to be comforting by many participants. While this theme is characterized by independent activities that can be enjoyed in the home, we differentiate between those who preferred more passive activities such as bathing and napping, and those who preferred more energetic activities, such as household chores.	*"Keeping my mind occupied with television, reading or sleeping during the day."* *"Keeping the house tidy and clean which has been very satisfying."*
Creative Activities	Preparing for new baby Cooking/baking Crafting	Creative activities were shared by some participants as being beneficial additions to their coping strategies. These included making arrangements for a new baby, cooking, baking, and crafting.	*"I am finding ways to make myself more excited about the baby having a friend do weekly bump photos outside my home and making a pregnancy book."* *"Cooking nice food and getting excited about meals."*

Social and/or Cultural Activities	Cultural practice and connection Engaging with children Safe in-person interactions Virtual social connection Pets	Socializing was a key theme among participants for maintaining wellbeing through the pandemic and navigating isolation during pregnancy. Cultural values were also referenced by some. Of particular note were the challenges communities faced engaging in community connection and cultural practices due to additional barriers brought forth by the pandemic. Participants found that interacting at home with their children, pets, and partners was helpful in mitigating stress. Staying connected to extended family and friends in person when it was safe to do so, or virtually when necessary, was also noted as helpful.	*"I am taking this extra time to really learn new ways to grow and have been reaching out for support more and talking more about my struggles with family and peers. Using snapchat had helped me keep in contact with my friends and loved ones."* *"Trying to connect with the Indigenous community online."* *"Moved into my parent's house to have more help with the toddler and more socialization for all of us."*
Avoidant Approaches	Limiting news Maintaining normalcy Working Routine and structure	In contrast to those who found solace in staying informed on matters related to the pandemic, others found it more helpful to avoid news consumption and attempt to remain grounded in normalcy and routine. For example, by continuing to work and be consistent in the structure of their pre-pandemic lives, as well as those of their children, participants felt it easier to cope with circumstances of the broader environment.	*"Only watch a little news in the morning but otherwise tuning it out."* *"Keeping to my normal pre-pandemic routine as much as possible."*
Internal Mental Health Strategies	Optimism and mindfulness Gratitude Therapy	Perception-based strategies were employed by some participants in order to combat stressors arising as a result of the pandemic. These included being optimistic and mindful, finding opportunities to reflect and experience gratitude, taking life one day and a time, and attending mental health therapy sessions.	*"I lost my mom and brother the year before the pandemic. So, comparatively, perspective has been important. I had already turned 'inward' and slowed my life to accommodate my grief journey. Pandemic felt like an extension of this."* *"I've also been able to find joy in many things, and am extremely grateful to be in such a position to be able to work, help, feel financially stable, and re-connect with my family during what is globally such an uncertain time"*
Struggling to Cope	Not Coping	Some participants stated that they are not coping well, if at all. Expressions of frustration with public health regulations were also shared.	*"I am not coping well."* *"I'm not* [coping]*."* *"Beyond the things above grocery shopping, it really stresses me out. I hate all the stupid rules…"*

Discussion

During the COVID-19 pandemic, over half (>50%) of Indigenous pregnant individuals in our sample experienced clinically significant levels of prenatal depression and/or anxiety. Heightened levels of both depression and anxiety may have been impacted by uncertainty around the impacts of COVID-19, and time during which the data was collected, as health restrictions were high. Our results are consistent with other studies reporting increased depression and anxiety among pregnant individuals [31,2], along with increased mental wellbeing concerns amongst Indigenous populations [11,26]. Participants reported increased service disruptions due to the COVID-19 pandemic, including restricted access to quality care and decreased quality of prenatal care, changes to birthing plans, and decreased opportunities for social support during birthing.

Healthcare service use among pregnant individuals is dependent upon several elements related to sociodemographic factors, economics, and facility logistics, including distance to and quality of health care [60]. The COVID-19 pandemic presented with unique challenges that further limited healthcare service use among pregnant individuals due to issues such as decreased access to prenatal services and concerns about contracting COVID-19 [61]. For Indigenous communities, systemic racial discrimination and inequalities in health care accessibility create further barriers in accessing quality prenatal care [11,12,26]. Previous research suggests that there are strong associations between limited access to prenatal care and psychological distress among pregnant individuals, and our results mirror these findings when examining the Indigenous pregnant population in Canada [2].

The importance of accessible quality prenatal care for both the pregnant individual and unborn baby cannot be overstated in discussions to support the psychological wellbeing of Indigenous pregnant individuals. Experiencing difficulties in access to prenatal care and having greater concerns about quality of care was significantly predictive of both prenatal depression and anxiety symptoms. Additionally, experiencing changes in birthing plans was significantly predictive of prenatal anxiety. Pregnancy care service quality and accessibility issues along with changes in birth plan are linked to depressive and anxiety-based symptoms across multiple studies [62,63,64,65]. Discomfort with novel healthcare processes, such as virtual or telehealth appointments, and overlapping stress from experiencing a pregnancy during a global health pandemic may have further impacted self-reported levels of depression and anxiety. As pregnancies can be a time of heightened stress levels, uncertainties about accessing and quality of prenatal care are likely to impact mental wellbeing [66,67,68].

These findings are aligned with others that have emerged in the literature regarding pregnancy during the pandemic with anxiety, depression, and healthcare challenges noted consistently [69,24,70,71]. Theoretical foundations to support these findings can be seen in Maslow's classic conceptualization of the Hierarchy of Needs [72] where it is said that certain needs must be addressed prior to others. Specifically, physiological needs are posited to be of primary importance and said to be critical to address first, in order to then consider other needs. In this study, participants' disclosures of distress related to issues with basic healthcare reflects the imperative nature of caring for such fundamental needs. In addition to health inequities, Indigenous peoples also face socioeconomic disparities [73] which create further barriers in

accessing health care and is consistent with policies to reduce poverty related stress [74]. The impacts of colonization and generational wealth policies systematically create barriers for the wellness of pregnant Indigenous individuals. Due to the recruitment methodology of the larger Pregnancy During the COVID-19 Pandemic study, the sample generally skews towards higher socioeconomic status, thus, we may expect the importance of financial security to be more relevant in a more representative sample.

In addition to prenatal care, findings of this study also suggest the notable influence of social support on the wellbeing of pregnant Indigenous persons. Increased partner social support was predictive of decreased levels of depression and anxiety, while increased general social support was predictive of decreased levels of depression only. Similar findings were reported in the larger *Pregnancy during the Pandemic* sample by Lebel and colleagues (2020), which found that both partner and general social support predicted reduced levels of anxiety and depression in pregnant individuals. These findings mirror previous literature in the field, which demonstrates significant associations between social support and mental wellbeing concerns among pregnant individuals broadly [75,76,77], and among Indigenous pregnant individuals [34]. The emergence of partner social support as the most significant predictor for prenatal anxiety and depression in comparison to other levels of social support (i.e., general social support and social group attendance) is expected. At the height of the COVID-19 pandemic, numerous public health measures, such as mandatory lockdowns and social distancing, were introduced to limit transmission of the virus. For many individuals, these changes inadvertently affected access to social support systems outside the home, thereby increasing reliance on such systems within the home [78]. The COVID-19 Family Disruption Model [78] highlights the importance of these relationships and social support systems in maintaining wellbeing during periods of heightened stress. For pregnant individuals, the significant association between prenatal mental wellbeing and partner social support during the COVID-19 pandemic [79,80,24] presents partner support as a modifiable protective factor to enhance prenatal wellbeing.

In alignment with our objective to understand coping strategies, qualitative results reveal various approaches to coping with stressors as arisen through experiencing a pregnancy during a global health pandemic. These include strategies such as staying informed on the progression of the pandemic and public health guidelines, engaging in physical and/or outdoor activity, engaging in home-based and/or other independent activities, engaging in creative activities, engaging in social and cultural activities with family, developing mental wellbeing strategies and routines, (e.g., meditation, practicing gratitude, therapy) and attempting to avoid the pandemic reality (e.g., limiting news consumption). This is consistent with extant literature on coping mechanisms related to avoidance-based activities, connection driven activities, and alignment with recommendations for safety from public health governing bodies [43,44,45]. Some participants expressed struggles to cope or a perceived lack of coping entirely. Struggling to cope has been a consistent experience across pregnant individuals during the pandemic with shifting availability of pre-pandemic coping strategies and a substantial deviation from normalcy [81].

In Canada specifically, pregnant individuals during the pandemic were found to have increased rates of depression and anxiety as amplified by financial strain, social isolation, risk of contracting the COVID-19 infection, and relationship difficulties, which were buffered by social support [82,36]. With Indigenous persons in Canada, we expect to see increased levels of distress

due to disproportionate negative mental wellbeing experiences observed within that demographic [83,46,47]. This is exacerbated through neglectful and harmful interactions with healthcare systems [84]. It is important to acknowledge the resilience developed among Indigenous parents who continue to engage in support service-oriented research despite negative past and ongoing experiences throughout their pursuit of care in the perinatal period. Respondents in this study reported strengths with social and partner support and the use of various coping strategies which appear to add to resilience factors.

According to Lazarus and Folkman Transactional Theory of Stress and Coping (TTSC) [85] individuals interact with stress in a transactional exchange with their environment. Coping that ensues is said to be categorized based on problem focused and emotion focused strategies. Active coping aimed at addressing a given stressor is characteristic of a problem focused approach, whereas passive and avoidance-based coping is often representative of emotion focused strategies. Given that addressing the 'problem' at the root of the stressor in this circumstance, namely the COVID-19 virus, was largely outside of participants' control, active coping was seen in this sample through adherence to public health guidelines and taking steps to engage in health promoting activities such as being physically active and spending time outdoors. Additionally, avoidance-oriented coping was also noted in this sample, such as limited new consumption. Therefore, in keeping with the TTSC, both problem and emotion focused coping strategies are exemplified in our findings.

The Breath of Life Theory, coined by Blackstock [86], has been proposed as a critical framework for understanding relational elements of wellbeing and culturally centred understanding of needs for Indigenous, specifically First Nations, people. Our findings related to coping and social support provide evidence to support this in the present study, as these factors revealed connection to spiritual and cultural practice as well as social connection were vital supports in the face challenges imposed by the pandemic provide evidence to support this in the present study.

Limitations

A limitation of this study is the lack of inclusion of telehealth service use. As the participant sample consisted of Indigenous populations, the issue of limited access to reliable Wi-Fi and technology within some Indigenous communities should be noted as potentially impacting service use and disruption. Recruitment relying primarily on social media potentially reduced the number of participants that may have otherwise been recruited with a broader reach through other means. This may have also inflated the socioeconomic status of the sample due to the need for participants to have access to technology and social media. Therefore, our sample demographics reported household income as greater than the median for Canadian families in 2019 [87], which does not accurately reflect median incomes for Indigenous populations [88]. There was no assessment of the tole of traditional birthing and health practices, such as midwives, in the original study. Access to traditional healing practices may have impacted differently than Western medical practices. Further, research practices have been historically harmful when conducted with Indigenous populations [89,90,74]. This has led to mistrust of research groups and practices among Indigenous peoples and, consequently, may have impeded the participation of some Indigenous pregnant persons in this study. Finally, due to the heterogeneity of Indigenous communities, these findings may not be generalizable across all

Indigenous Nations and individuals, as values and beliefs held by one Nation or individual are not necessarily reflective of all. Accordingly, caution must be exercised in interpreting these results to not erroneously assume pan-Indigeneity of perspectives shared and conclusions drawn herein. Given the rapid-response survey development and broad reach of the original study, baseline stressors were not included as part of data collection. Additionally, anxiety and depression symptom scores were based on self-report scores and not clinical diagnoses.

Implications and Future Directions

These results carry important implications for the information of pregnant Indigenous persons through the illustration of challenges in accessibility of care and changes in prenatal care resulting from the pandemic. Healthcare providers may benefit from findings produced through this study to inform change aimed at adequately accommodating the healthcare related needs of Canadian Indigenous peoples experiencing a pregnancy. As part of the greater longitudinal objectives, future research will continue to track mental wellbeing of individuals who were pregnant during the pandemic and examine child wellbeing outcomes. Postpartum care will be studied to understand the extent to which services are improved or hindered as the pandemic progresses. Additionally, examining the racial and ethnicity concordance of service providers, along with access to traditional birthing services, should be examined for any potential influences on service access and use among the population in this study.

Service disruptions and/or low qualitive prenatal care is a serious issue which exacerbates systemic inequities and contributes to poor mental wellbeing [13,26]. Aspects of service disruptions, such as access to traditional birthing methods and the use of telehealth services should be carefully considered. Social support, including partners and social groups, seems to be a protective factor for pregnant individuals. Enhancing the efficacy of policies and programming surrounding prenatal care, including the incorporation of a framework grounded in Indigenous perspectives [19], to increase accessibility and incorporate protective factors can increase quality of care. Further research in this area is warranted to understand the impact of COVID-19 on pregnant individuals, as exemplified by the following open-text response received from one of our participants:

> *"I appreciate your researchers looking into this as for some time when the pandemic started, I felt invisible as a pregnant person as no one was paying attention to us so this makes me feel really good that as a group we are being considered. Thank you for your work."*

Contributorship statement

GG, CL, LTM conceptualized the original study for which this study branches from. All authors were involved in conceptualization of this study. MM, SLP, JK, and JD were involved in drafting the manuscript, data analysis and interpretation. GG, CL, LTM, LR, and LW were involved in reviewing the manuscript. All authors gave final approval of the version to be published and agreement to be accountable for all aspects of the work.

Data availability statement
All data relevant to the study are included in the article or uploaded as online supplemental information

Competing Interest Statement
The authors declare no competing interests.

Ethics approval
This study involves human participants and was approved by the University of Calgary Conjoint Health Research Ethics Board (REB20-0500). Participants gave informed consent to participate in the study before taking part.

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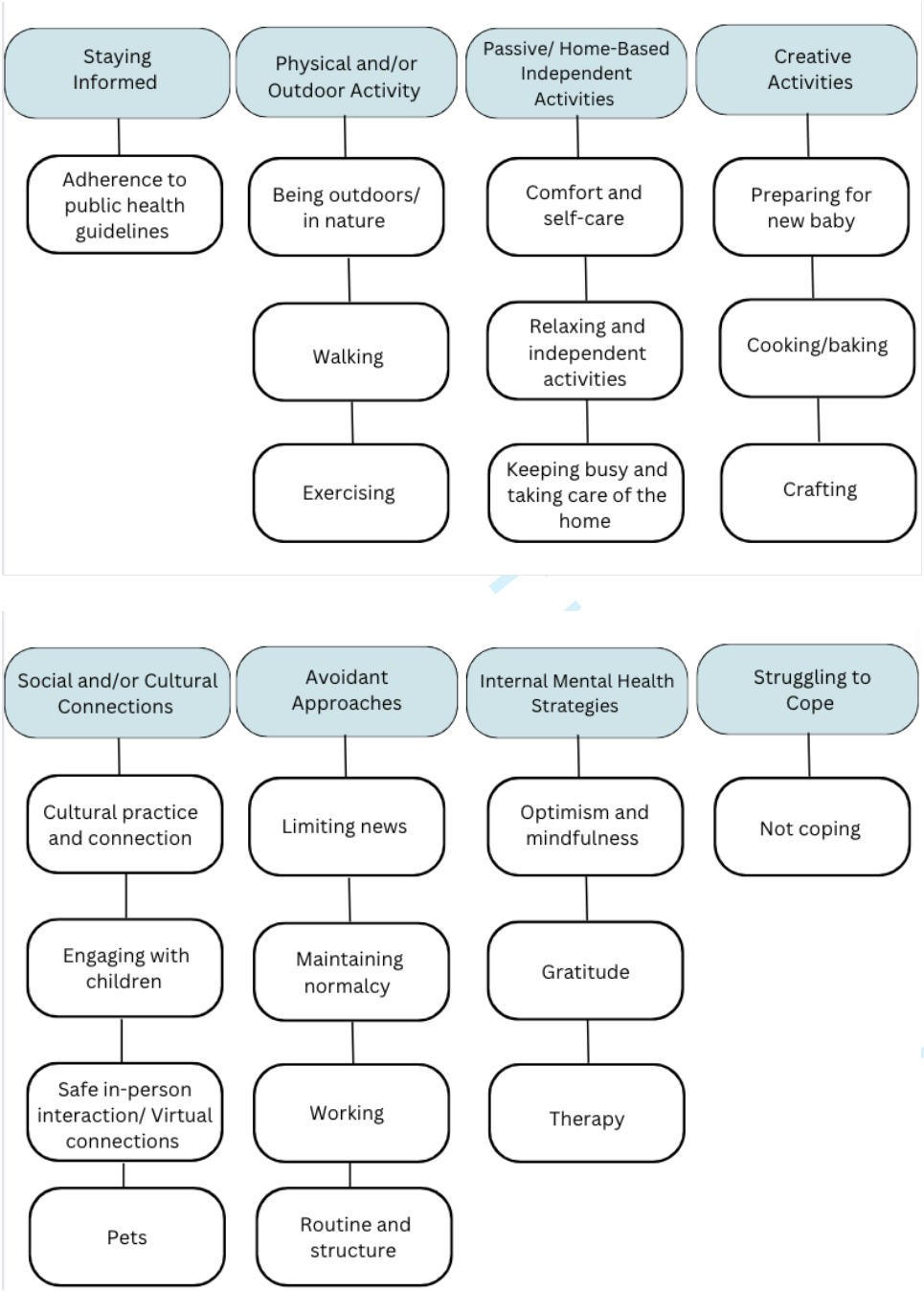
Figure Legend:
Figure 1 - Flow chart.

Figure 1
Coping Strategies Themes and subthemes



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

	Item No	Recommendation	Manuscript Location
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Page 1 (title page)
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	Page 2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Page 3-4
Objectives	3	State specific objectives, including any prespecified hypotheses	Page 4, paragraph 4
Methods			
Study design	4	Present key elements of study design early in the paper	Page 4, paragraph 4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Page 5, paragraph 1
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	Page 5, paragraphs 1 and 2
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Page 5, paragraph 3 - page 6, paragraph 5
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	Page 5, paragraph 3 – page 6, paragraph 5
Bias	9	Describe any efforts to address potential sources of bias	
Study size	10	Explain how the study size was arrived at	Page 5, paragraph 2
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Page 6. paragraph 6
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	Page 6-7
		(*b*) Describe any methods used to examine subgroups and interactions	N/A
		(*c*) Explain how missing data were addressed	Page 6, paragraph 4
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(*e*) Describe any sensitivity analyses	N/A
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,	N/A

		completing follow-up, and analysed	
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Page 5, paragraph 2
		(b) Indicate number of participants with missing data for each variable of interest	Page 6, paragraph 6
Outcome data	15*	Report numbers of outcome events or summary measures	N/A
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	Page 6, paragraph 7
		(*b*) Report category boundaries when continuous variables were categorized	Page 8; 10-11
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Page 13 – 17 (qualitative analysis)
Discussion			
Key results	18	Summarise key results with reference to study objectives	Page 17-18
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	Page 20, paragraph 3
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Page 17-21
Generalisability	21	Discuss the generalisability (external validity) of the study results	Page 21, paragraph 1
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	Page 21

*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.