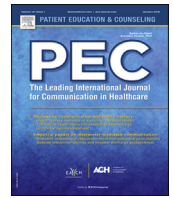




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Short Communication

Concerns of women regarding pregnancy and childbirth during the COVID-19 pandemic

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ABSTRACT

Objective: Better understand knowledge, attitudes and practices of pregnant women and mothers of infants around coronavirus disease 2019 (COVID-19).

Methods: A 58-item electronic survey was distributed to pregnant and postpartum women (infants ≤ 12 months) who were >15 years, English-speaking and enrolled in prenatal programs. Data is summarized using central tendency, frequencies and nonparametric statistics.

Results: Of 114 (51 % response rate) participants, 82.5 % reported negative changes in mental status measures (e.g. stress, anxious thoughts, changes in sleep patterns). All reported risk-reduction behavior changes (e.g. handwashing/use of sanitizer, social distancing). Significant changes were reported in employment and financial status due to the pandemic. Increases in alcohol consumption among postpartum women were also reported. Few reported changes in prenatal, infant or postpartum healthcare access.

Conclusion: This study provides initial insight into the knowledge, attitudes and practices of pregnant and postpartum women during the COVID-19 pandemic. This study is limited as participants represent a single Midwest community and social desirability response bias may have impacted responses. However, results may inform future interventions to support pregnant women and mothers of infants during pandemics.

Practice implications: Providers should consider the impact of such events on mental status, access to resources and changes in behaviors.

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1. Introduction

First identified in Wuhan, China, the coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is novel enough that minimal information is known regarding impact on pregnant women and infants [1–7]. The CDC recommends pregnant women protect themselves from exposure to COVID-19 [8] as early data suggests negative outcomes

for infants of COVID-19-infected women may include preterm birth, fetal distress, premature labor, respiratory distress and perinatal death [9–12]. With overwhelming misinformation regarding COVID-19 [13] and females expressing significantly higher levels of stress, anxiety and depression [14], it is crucial to assess the impact on perinatal women. The purpose of this study is to better understand knowledge, attitudes and practices of perinatal women regarding COVID-19.

2. Methods

This observational cohort study utilized a convenience sample of pregnant women or mothers of infants <12 months enrolled in programs serving women at high-risk for poor birth outcomes (e.g. low income, uninsured). Participants were >15 years, residing in Sedgwick County and English speaking.

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A brief study overview and the Research Electronic Data Capture (REDCap) [15] survey link and informed consent information were emailed on April 22, 2020. Two reminders were sent at 1-week intervals. The 58-item survey included demographics, pandemic-related behaviors [16], pregnancy, infant and self-care, access to healthcare, mental health, and financial stability [17]. Due to skip logic most participants were not asked all items. Response time was <30 min. Respondents received a \$25 gift card.

Relationships between demographic and other variables were evaluated by McNemar's Test, Wilcoxon Signed Rank Test and Chi Squared Likelihood-Ratio Test using SPSS for Windows, Version 23.0. Comparison of behaviors by distress and knowledge level violated assumptions due to low response rates in some categories, even when categories were truncated. The study was approved by the University of Kansas Medical Center Institutional Review Board.

3. Results

3.1. Participants

Of 222 potential participants, 114 (51 %) completed the survey; 46 (40.4 %) were pregnant and 68 (59.6 %) postpartum. No significant demographic differences were identified between pregnant and postpartum respondents; therefore, data is combined (Table 1).

3.2. Knowledge and direct experience

Participants reported knowing a lot ($n = 41$; 36.0 %) or a little about COVID-19 ($n = 71$; 62.3 %), with few knowing nothing/being unsure ($n = 2$; 1.8 %). Most reported being very concerned ($n = 48$;

42.1 %) or somewhat concerned ($n = 48$; 42.1 %), with a minority not very/not at all concerned about COVID-19 ($n = 17$; 14.9 %). Three (13.6 %) had been tested for COVID-19.

Significant reductions in financial status and employment were reported during the pandemic (Table 2). Unmet needs ($n = 23$; 20.2 %) included lack of essential items (e.g. diapers) due to low stock in stores or finances, reduced social support and inability to access lactation, therapy and other support services.

Few participants experienced changes in healthcare access (Table 3). For those who did, it was at the physician's request prenatally, but the woman's preference for infant and postpartum appointments.

3.3. Mental health

Participants reported changes in mental status related to the COVID-19 pandemic ($n = 94$, 82.5 %), including increased stress ($n = 72$; 63.2 %), increased anxious thoughts ($n = 57$; 50.0 %), changes in sleep patterns ($n = 54$; 47.4 %), reduced motivation ($n = 53$; 46.5 %), increased fearful thoughts ($n = 46$; 40.4 %), changes in appetite ($n = 46$; 40.4 %), racing thoughts ($n = 41$; 36.0 %), difficulty in focus and concentration ($n = 42$; 36.8 %), depressed mood ($n = 33$; 28.9 %) and increased tearfulness ($n = 23$; 20.2 %).

Most reported no change ($n = 79$; 69.3 %) or increases ($n = 5$; 4.4 %) in social support. However, 24.6 % ($n = 28$) reported decreases in support from family, friends, coworkers, and support services.

Many ($n = 62$; 54.4 %) described self-care strategies such as focusing on things they can control, daily physical activity (e.g., walking, yoga), cleaning and organizing, meditation, reaching out to family and friends on the phone and limiting exposure to the news.

3.4. Risk reduction behavior changes

All ($n = 114$; 100 %) participants reported behavior change due to the COVID-19 pandemic, including frequent hand washing/use of sanitizer ($n = 113$; 99.1 %), reducing time in places with >10 people ($n = 113$; 99.1 %), reducing contact with people outside of own household ($n = 112$; 98.2 %), avoiding contact with others who had symptoms ($n = 111$; 97.4 %), avoiding touching eyes, nose or mouth ($n = 105$; 92.1 %), and purchasing or making a face mask ($n = 79$; 69.3 %). Additional behaviors are in Table 4.

The majority reported following the State and County Stay-at-Home orders (enacted 3/23/2020 and 3/25/2020 respectively) all ($n = 70$; 61.4 %) or most of the time ($n = 40$; 35.1 %), and fewer some of the time or not at all ($n = 4$; 3.5 %).

3.4.1. Pregnancy behaviors

Of those currently pregnant or recently delivered, half expressed concerns about their partner's ability to attend the delivery ($n = 43$; 51.2 %). Some changed their birth plan ($n = 18$; 21.4 %), reducing to one support person due to hospital limitations, requesting induction, or reducing elective procedures. Other pregnancy changes included canceled events (e.g. baby showers, parent courses) and not allowing visitors after infant is home.

3.4.2. Infant care behaviors

Changes in infant sleep practices were reported with 39.5 % ($n = 45$) following or planning to follow the American Academy of Pediatrics Safe Sleep Guidelines (alone, on the back, in a clutter-free crib) [18] prior to the pandemic compared to 36 % ($n = 41$) at time of survey ($p = 0.219$). Increased unsafe practices were related to bedsharing.

For most, breastfeeding behavior/plans did not change (68.5 % ($n = 76$) breastfeeding; 9.9 % ($n = 11$) not breastfeeding). However, two (1.8 %) not planning to breastfeed decided to, six (5.4 %) who

Table 1
Participant demographics.

	Mean (SD); range
Woman's Age (years)	25.3 (SD = 6.0); 16 to 38
Infant's Age (months)	3.3 (SD = 2.4); 0 to 10
Children (not including pregnancy)	1.2 (SD = 1.2); 0 to 5
	N (%)
Race/Ethnicity	
Non-Hispanic White	49 (43.0)
Non-Hispanic Black	22 (19.3)
Hispanic	30 (26.3)
Multi-racial	6 (5.3)
Other	7 (6.1)
Relationship Status	
Married	44 (38.6)
Partnered	26 (22.8)
Single	41 (36.0)
Separated/Divorced	3 (2.6)
Education Level	
Some High School	18 (15.8)
High School Graduate/GED	50 (43.9)
2-year Community College	18 (15.8)
4-year College	14 (12.3)
Graduate Degree	8 (7.0)
Other	6 (5.3)
Insurance	
Medicaid	65 (57.5)
Private Insurance	28 (24.8)
Managed Care Org./Marketplace	4 (3.5)
Military	4 (3.5)
Self-pay	12 (10.6)
Mental Health Diagnoses	
Anxiety	11 (9.6)
Depression	9 (7.9)
Both	34 (29.8)

Missing: Insurance, $n = 1$.

Table 2
Employment and Financial Status Before and After COVID-19 Pandemic.

	Pre-pandemic N (%)	Current N (%)
Employment Status*		
Full-time	46 (40.4)	29 (25.4)
Part-time/Seasonal	23 (20.2)	17 (14.9)
Not Employed – Not Looking	26 (22.7)	44 (38.6)
Not Employed - Looking	19 (16.7)	24 (21.1)
Working in Healthcare (if employed)	13 (19.1)	11 (23.9)
Financial Status*		
Struggling to keep up with the costs of living	29 (25.9)	57 (50.4)
Comfortable meeting the costs of living	66 (58.9)	45 (39.8)
Keeping up with the costs of living with extra money	17 (15.2)	11 (9.7)

Missing: Working in healthcare pre-pandemic (n = 1).

* Indicates statistically significant difference (p < 0.001) between pre-pandemic and current responses based on the Wilcoxon Signed Rank Test.

Table 3
Healthcare Appointment Changes as a Result of the COVID-19 Pandemic.

	Pregnancy N (%)	Infant N (%)	Postpartum N (%)
Change in in-person appointments			
Increased	2 (2.4)	1 (0.9)	–
Decreased	9 (10.7)	7 (6.3)	–
Stayed the Same	56 (66.7)	79 (71.2)	–
Don't know	17 (20.2)	24 (21.6)	–
Change or plan to change appointments			
Plan to and still plan to	–	–	84 (75.0)
Plan to but do not plan to	–	–	3 (2.7)
Did not plan to and do not plan to	–	–	6 (5.4)
Did not plan but now plan to	–	–	1 (0.9)
Don't know	–	–	18 (16.1)
Decision to change appointments			
Mother, alone	3 (27.3)	5 (62.5)	2 (50.0)
Doctor requested	7 (63.6)	0 (0.0)	0 (0.0)
Both, Mother and Doctor	0 (0.0)	3 (27.5)	1 (25.0)
Don't know	1 (9.1)	0 (0.0)	1 (25.0)
Offered telehealth appointment	4 (36.4)	4 (50.0)	30 (26.8)
Attended telehealth appointment	2 (50.0)	4 (100)	16 (53.3)
Satisfaction with telehealth appointment			
Very satisfied	0 (0.0)	2 (50.0)	11 (68.8)
Satisfied	0 (0.0)	1 (25.0)	5 (31.3)
Neutral	1 (50.0)	1 (25.0)	0 (0.0)
Dissatisfied	0 (0.0)	0 (0.0)	0 (0.0)
Ver dissatisfied	1 (50.0)	0 (0.0)	0 (0.0)

Table 4
Behavior Change as a Result of the COVID-19 Pandemic.

	Pregnant			Postpartum		
	Increased N (%)	Remained the Same N (%)	Decreased N (%)	Increased N (%)	Remained the Same N (%)	Decreased N (%)
Engage in Moderate Physical Activity	6 (13.0)	24 (52.2)	15 (32.6)	12 (17.6)	30 (44.1)	25 (36.8)
Eat Unhealthy Foods	14 (30.4)	21 (45.7)	10 (21.7)	17 (25.0)	31 (45.6)	17 (25.0)
Tobacco Use	1 (2.2)	3 (6.5)	2 (4.3)	8 (11.9)	7 (10.4)	2 (3.0)
Alcohol Use*	0 (0.0)	3 (6.5)	1 (2.2)	7 (10.4)	9 (13.4)	6 (9.0)
Marijuana Use	0 (0.0)	3 (6.7)	2 (4.4)	1 (1.5)	4 (6.1)	2 (3.0)
Other Substance Use	0 (0.0)	3 (6.5)	1 (2.2)	1 (1.5)	1 (1.5)	2 (3.0)

N/A responses: Physical Activity, pregnant (n = 1; 2.2 %), postpartum (n = 1; 1.5); Unhealthy foods, pregnant (n = 1; 2.2 %); postpartum (n = 3; 4.4 %); Tobacco use, pregnant (n = 40; 87 %), postpartum (n = 50; 74.6 %); Alcohol use, pregnant (n = 42; 91.3); postpartum (n = 45; 67.2 %); Marijuana use, pregnant (n = 40; 88.9 %), postpartum (n = 59; 89.4 %); Other substance use, pregnant (n = 42; 91.3 %), postpartum (n = 63; 94 %).

Missing: Tobacco use (n = 1); Alcohol use (n = 1); Marijuana use (n = 3); Other substance use (n = 1).

* Indicates statistically significant differences (p < 0.05) between pregnant and postpartum respondents based on the Chi Squared Likelihood-Ratio Test.

planned to breastfeed decided not to and eight (7.2 %) were unsure. Other infant care behavior changes included limiting contact with infant, scheduling appointments to avoid sick patients and taking precautions such as hand washing and protective barriers when leaving the house.

3.4.3. Postpartum behaviors

Most (n = 80; 72.1 %) reported no change in family planning strategies. Of those who reported a change (n = 9; 8.1 %), reasons included missed appointments delaying receipt of contraception and deciding to postpone subsequent pregnancies; the remainder

(n = 22; 19.8 %) were unsure. Due to COVID-19 women also reported decreased likelihood of talking to doctor about medications and mental health concerns.

3.5. Acceptability of COVID-19 vaccination

If a COVID-19 vaccination became available, 47.8 % would be interested in receiving it (n = 54); 23.0 % (n = 26) would not and 29.2 % (n = 33) were unsure. Concerns included side effects or sickness (n = 33; 55.9 %), cost (n = 3; 5.1 %), allergy to vaccines (n = 1; 1.7 %) and perception it is unnecessary (n = 2; 3.4 %).

4. Discussion and conclusion

This exploratory study identified behavior changes of perinatal women specifically attributed to the COVID-19 pandemic. Surveys were collected while cases of COVID-19 were increasing daily [19]. The State and County Stay-at-Home orders expired May 3, 2020 [20] but were in effect for most of the data collection. Positive behaviors, such as adherence to the stay-at-home orders and following CDC risk reduction recommendations [8], were reported by most participants. In addition, smaller numbers reported positive impacts such as increased physical activity and decreased consumption of unhealthy foods or use of substances. For most, no changes in frequency of healthcare visits were reported.

Some participants reported negative behaviors attributed to the pandemic, including decreased physical activity or increased unhealthy behaviors; increased alcohol use was significantly higher postpartum. A few reported engaging in bedsharing due to the pandemic, which increases risk of sleep-related infant death [21].

Some of these behavior changes may be a direct result of increased stress and anxiety due to the pandemic. In general, up to one quarter (25 %) of women experience psychological distress during pregnancy which can lead to poor birth outcomes [22,23]. Stressful events also have significant deleterious effects on birth outcomes [24]. In the current study, most participants (82.5 %) reported changes in mental status, such as increased stress and anxious thoughts. When a physician struggles with anxiety related to pregnancy during the COVID-19 pandemic [25], it is unsurprising survey respondents also reported such feelings.

4.1. Practice implications

The continuity of clinical care reported presents an opportunity for providers to assess mental status, as well as unmet needs during the pandemic. It also offers opportunity to reinforce risk reduction behaviors (e.g. infant safe sleep) and areas within the women's control (e.g. handwashing, limiting exposure, individual stress reduction activities). Providers should consider addressing social support concerns as nearly a quarter of participants reported decreases due to the pandemic. Social support may provide a buffering affect against preterm birth for women with high stress [26] and lack of support has been linked to increased levels of antenatal anxiety and depression [27]. As such, helping women identify strategies to maintain social support systems is of utmost importance.

4.2. Limitations

This study is limited as participants represent a single Midwest community and were enrolled in perinatal programs, so may not reflect women not engaged in services. Self-report data may reflect social desirability response bias. Behavior change was assessed specifically as a result of the COVID-19 pandemic and due to lack of time-frame-specific information it was not possible to compare

breastfeeding and sleep practice data to those normally observed in the postpartum period.

4.3. Conclusion

This study provides initial insight into the knowledge, attitudes and behaviors of perinatal women during the COVID-19 pandemic. Providers should consider the impact such events may have on mental status, access to resources and social supports, and changes in behaviors. Providers should establish screening, education and referral procedures to help mitigate these negative outcomes.

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CRedit authorship contribution statement

Carolyn R. Ahlers-Schmidt: Conceptualization, Methodology, Resources, Writing - original draft, Writing - review & editing, Visualization, Supervision, Funding acquisition. **Ashley M. Hervey:** Methodology, Software, Formal analysis, Investigation, Resources, Writing - original draft, Writing - review & editing, Visualization, Project administration. **Tara Neil:** Methodology, Writing - review & editing. **Stephanie Kuhlmann:** Methodology, Writing - review & editing. **Zachary Kuhlmann:** Methodology, Writing - review & editing.

Declaration of Competing Interest

The authors report no declarations of interest.

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