

Associations Between COVID-19-Related Changes to Pregnant Women's Work-Plans and Prenatal Depression

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Abstract

Purpose: To identify whether COVID-19-related changes to how long pregnant women planned to work in pregnancy were associated with depression.

Methods: An online convenience sample of pregnant women in the U.S. were recruited in April-May 2020 (N = 1,970) through social media and dissemination to U.S.-based maternal health contacts. We used multivariate logistic regression to evaluate whether COVID-19-related changes to pregnant women's work-plans were associated with clinically-significant prenatal depression (Edinburgh Postnatal Depression Survey score ≥ 15), adjusting for covariates.

Results: Of the 1,600 eligible participants without missing data, 29.6% of participants (N = 473) reported that they experienced a COVID-19-related work-plan change, while 22.1% (N = 350) of participants had a clinically-significant EPDS score. Women were more likely to report a work-plan change if they were younger ($t(1598) = 2.90, p < 0.004$), had a lower household income ($\chi^2(2) = 29.63, p < 0.001$), were less educated ($\chi^2(2) = 27.48, p < 0.001$), were farther along in pregnancy ($t(1598) = -4.96, p < 0.001$), and worked outside the home during COVID-19 ($\chi^2(2) = 59.27, p < 0.001$). Both COVID-19-related work-plan changes (OR = 1.74, 95% CI 1.34 – 2.25, $p < 0.001$) and uncertainty about the nature of these changes (OR = 2.70, 95% CI 1.22 – 5.96, $p = 0.014$) were associated with significantly higher odds of a clinically-significant depression score.

Conclusion: Pregnant women who experienced a work-plan change or who were uncertain about how COVID-19 would impact their work-plans were significantly more likely to experience depression, suggesting a need for universal access to prenatal depression screening and paid maternity leave.

Introduction

The COVID-19 pandemic has drastically affected employment in the U.S., with national unemployment rates reaching 14.7% in April 2020 (Bureau of Labor Statistics 2020; Couch et al 2020). Women, especially pregnant women, are over-represented in low-wage industries impacted by the pandemic (e.g., service and hospitality) (Harwood and Heydemann 2019; Onwuzurike et al 2020; Alon et al 2020). Additionally, due to the absence of universal paid maternity leave and strict eligibility requirements for the federal 1993 Family and Medical Leave Act (FMLA), pregnant women working outside the home may be forced to choose between keeping their job and risking infection (Birsner and Morris 2018; Zagorsky 2017; Donovan 2018; Rubin 2016; Jackson et al 2015).

Perceived lack of control over life events (e.g., uncertainty about future work-plans) can substantially impact mental health, increasing depression risk (Dijkstra and Homan 2016; Rubenstein et al 2016; Brown and Naragon-Gainey 2013; Havranek et al 2016). Depression during and after pregnancy is more common than in the general population, affecting one in seven women (ACOG 2018; Kanes et al 2017). Although perinatal depression may increase during COVID-19 (Saccone et al 2020; Fakari and Simbar 2020; Davenport et al 2020), in-person screens for depression have likely decreased due to fewer

antenatal visits and a shift to telehealth (Onwuzurike et al 2020; Rupsa et al 2020), making it especially important to identify risk factors for prenatal depression during the pandemic.

Given this background, we examined whether COVID-19-related changes to how long women intended to work during their pregnancy, and uncertainty about these changes, were associated with prenatal depression. We hypothesized that currently-working women reporting changes to how long they planned to work in pregnancy or uncertainty about their plans during COVID-19 would have significantly higher depression scores. Information on the effects of COVID-19 on pregnant women's work-plans and associated depression risk can help guide both the development of comprehensive national policies on paid maternity leave, and universal screening and referral protocols for perinatal depression.

Methods

Data come from the COVID-19 and Reproductive Effects (CARE) study, an online survey that was administered to a convenience sample recruited primarily through social media (i.e., Twitter and Facebook) and via dissemination to U.S.-based contacts working in maternal health. Surveys were completed between April 16th -30th 2020. The target population for the CARE study were US-based pregnant women aged 18 years or older, while the present analysis focuses specifically on those participants who were currently working. This study received ethical approval from Dartmouth College (STUDY00032045). Informed consent was collected by participants clicking a box saying that they consent to the information provided on the consent form. Participants were informed that the survey would take approximately 10–15 minutes to complete and were provided with details about data storage, data security, PI information, and the purpose of the study. Only survey site visitors who met the inclusion criteria were eligible to participate in the survey. The survey was administered in REDCap, which automatically captures survey responses.

Completion of the survey was voluntary, and participants were allowed to skip any questions they did not want to answer. Only individuals who completed the survey (went through to the end of the questionnaire, even if they were missing data on individual questions) were included in the analysis. Of 2,467 people who consented to take the survey, 1,970 completed it (80%). Of the complete surveys, 1,600 women were currently working and therefore eligible for inclusion in these analyses.

COVID-19 pandemic effects on work-plans: Participants were asked “Has the pandemic changed your plans for how long you plan to work during your pregnancy?” (yes/no)

Work-plan uncertainty. If participants reported that COVID-19 had changed their work-plans, they were then prompted to qualitatively describe how their work-plans were affected. From the 438 participants who provided a qualitative response, we identified participants who indicated they were uncertain of how their work-plans would be affected by the pandemic (N = 30), since uncertainty could contribute to increased emotional distress (Shihata et al 2016).

Work location: Participants who reported that they were currently working were asked to identify their work location (from home; outside the home; or both).

Depression symptoms: Depression symptoms were screened for using the Edinburgh Postnatal Depression Survey (EPDS) (Cox et al 1987). Depression symptoms were analyzed according to clinically-significant depression criteria for pregnant women (cut-point ≥ 15) (Matthey et al 2006).

Age: Participants self-reported their age in years.

Education: Participants selected their highest completed education from the following options: Some high school, no diploma (1) High school graduate, diploma or the equivalent (for example: GED) (2) Some college credit, no degree (3) Trade/technical/vocational training (4) Associate degree (5) Bachelor's degree (6) Master's degree (7) Professional degree (8) Doctorate degree (9). A composite education variable was created for analysis: less than a bachelor's degree, a bachelor's degree, or a degree beyond a bachelor's degree.

Household income: Participants indicated their annual household income (USD) from the following options: Less than \$10,000 (1); \$10,000 - \$19,999 (2); \$20,000 - \$34,999 (3); \$35,000 - \$49,999 (4); \$50,000 - \$74,999 (5); \$75,000 - \$99,999 (6); \$100,000+ (7). A composite household income variable was created for analysis: <\$49,999, \$50,000-\$99,999, and \$100,000+.

Race/ethnicity: Race/ethnicity were self-reported and measured according to the Office of Management and Budget Standards (Office of Management and Budget 1997). Native Hawaiian/Pacific Islander participants were re-classified as "Other" due to a small sample size (N = 3).

Current gestational week: Participants indicated their current gestational week.

High-risk pregnancy: Women were asked whether their pregnancy had been classified as "high-risk" by their maternity care provider or if they were aged 35 or older.

Self-reported health: Women were asked whether they would describe their health as poor, fair, good, or excellent. This was re-categorized into good/excellent vs poor/fair.

Statistical analysis: Data analyses were conducted using Stata 15.1. All continuous variables exhibited normal distributions, with skewness values within approximately +/-0.5 and kurtosis values within approximately +/-3. Multicollinearity was not detected between any variables; all VIF values were in an acceptable range of 1.03-1.75. Sample descriptive statistics were calculated and bivariate analyses were conducted to evaluate significant differences in study covariates according to COVID-19-associated work-plan changes. A multivariate logistic regression was used to evaluate whether work-plan changes predicted a clinically-significant depression score (EPDS \geq 15; yes/no). We then repeated this analysis to evaluate whether there was an association between depression and work-plan uncertainty (i.e., whether women were unsure how their work-plans would be affected). All regression models were adjusted for

maternal age, education, income, week of pregnancy at time of survey, self-rated health, race/ethnicity, and “high-risk” pregnancy.

Results

In total, 1,600 participants were eligible for the study (currently working) and were not missing data for study variables and were therefore included in the analysis. Study participants were an average of 31.6 years old and 26.5 weeks pregnant. The study population was 87.3% White, 5.5% Hispanic/Latina, 1.4% African American, 3.4% Asian, 0.5% American Indian/Alaskan Native, and 1.8% Other. Over one-third (33.8%) of the study population had a college education, and nearly one-half (48.5%) of the study population had a degree beyond a college education. When asked about household income, 8.6% of respondents reported earning <\$49,999 annually, 30.9% reported earning between \$50–99,000, and 60.6% reported earning \$100,000+ (Table 1). Moreover, 29.6% of study participants (N = 473) reported that they experienced a COVID-19-related work-plan change (Table 1).

In bivariate analyses, women who experienced a COVID-19-related work-plan change were significantly younger ($t(1598) = 2.90, p < 0.004$), reported lower household incomes ($\chi^2(2) = 29.63, p < 0.001$), were less educated ($\chi^2(2) = 27.48, p < 0.001$), were farther along in pregnancy ($t(1598) = -4.96, p < 0.001$), and were more likely to continue to work outside the home during COVID-19 ($\chi^2(2) = 59.27, p < 0.001$) compared to women who did not experience a COVID-19-related work-plan change. There were no statistically significant differences in race/ethnicity ($\chi^2(5) = 6.64, p = 0.25$), high-risk pregnancy ($\chi^2(1) = 0.75, p = 0.39$), previous birth ($\chi^2(1) = 0.18, p = 0.67$), self-rated health ($\chi^2(1) = 1.54, p = 0.22$) or provider type ($\chi^2(2) = 1.65, p = 0.44$) between women reporting a work-plan change and those reporting no change (Table 1).

Women who experienced a COVID-19-related work-plan change had a significantly higher average EPDS score (11.9) compared to women who did not have a COVID-19-related work-plan change (EPDS = 9.9; $t(1598) = -6.97, p < 0.001$). In multivariate logistic regression models using an EPDS score ≥ 15 as the cutoff for depression and adjusting for covariates, women reporting a work-plan change were significantly more likely to exhibit a clinically-significant level of depression compared to women reporting no work-plan change (OR = 1.74, 95% CI 1.34–2.25, $p < 0.001$). In addition, uncertainty about the nature of the work-plan change also significantly predicted clinically-significant depression (OR = 2.70, 95% CI 1.22–5.96, $p = 0.014$). Self-rated health was the only covariate that was significantly associated with whether or not women had a COVID-19-related work-plan change (OR = 0.27, 95% CI 0.18–0.41, $p < 0.001$) (Table 2).

Discussion

Pregnant women who reported that COVID-19 had affected how long they planned to work during pregnancy were significantly more likely to exhibit signs of clinical depression, as were women who were unsure how their work-plans would be affected by COVID-19.

Pregnant workers are especially vulnerable to COVID-19-related work disruptions. The three most common occupations for pregnant women are elementary school teachers, nurses, and home health aides, all of which have been considered essential during the COVID-19 pandemic and may put women at significant risk of contracting disease (Harwood and Heydemann 2019). Additionally, more than one in five pregnant workers are employed in low-wage jobs, which often have inflexible scheduling (impairing ability to attend doctor appointments) and generally lack paid sick leave or work-from-home options (Harwood and Heydemann 2019; Onwuzurike et al 2020; Alon et al 2020). These factors render pregnant workers in essential and low-wage positions more susceptible to developing COVID-19 and thus increase their likelihood of having a work-plan change during the pandemic, either because they may become sick or fear becoming sick.

Additionally, uncertainty surrounding future work-plans appears to be an important determinant of depression risk among pregnant women, which is consistent with previous findings that perceived lack of control over life events is central to the development of depression (Rubenstein et al 2016; Hayranek et al 2016; ACOG 2018; McEvoy and Mahoney 2012; Carleton et al 2012). Obstetric care providers can use this information to better identify risk factors for perinatal depression during COVID-19 and more effectively communicate with patients while screening for depression risk.

Unfortunately, even though mental health concerns may be increasing during the pandemic, in-person clinical screens for depression have decreased as most prenatal appointments are done by telehealth/remotely (Onwuzurike et al 2020; Saccone et al 2020; Fakari and Simbar 2020; Davenport et al 2020; Rupsa et al 2020). The American College of Obstetricians and Gynecologists recommends that obstetric care providers screen patients for depression and anxiety at least once during the perinatal period using a standardized, validated tool (ACOG 2018). Many studies (Onwuzurike et al 2020; Goecke et al 2012; Accortt et al 2015) have argued for obstetricians to go beyond this recommendation and make depression screening a routine part of prenatal care, as screening is critical to avoid adverse outcomes for mother and baby and to reduce postpartum depression risk, a leading cause of maternal mortality (Kanes et al 2017; Goecke et al 2012; Accortt et al 2015; Jago et al 2020; Robertson et al 2004).

One way to mediate the effects of COVID-19-related work-plan changes and prenatal depression would be through universal paid maternity leave, which could alleviate anxiety caused by choosing to work while risking infection (Onwuzurike et al 2020). The U.S. is one of just two countries in the world that does not guarantee paid maternity leave, despite the benefits associated with leave (e.g., reduced c-section rates, lower infant mortality, etc.) (Zagorsky 2017; Rubin 2016). The FMLA gives workers 12 weeks of *unpaid* time off, but only ~ 60% of workers are actually eligible (Birsner and Morris 2018; Rubin 2016; Jackson et al 2015). Employer provision of any *paid* family leave (PFL) is voluntary and more common among high-paying occupations; in 2018, only 16% of employees had access to PFL (Birsner and Morris 2018; Donovan 2018; Jackson et al 2015). Policy recommendations could therefore include instituting a universal paid family leave and/or temporarily suspending FMLA eligibility requirements (Alon et al 2020).

Despite the strengths of this study, including the large sample size and wide distribution of participants across the U.S., our study was limited by the nature of self-reported data (Schneider et al 2018). Additionally, as the survey was distributed through social media, it did not involve random sampling. Our study population was less diverse than the U.S. birthing population, with study participants more likely to be non-Hispanic White and report higher education and income levels than national averages (Martin et al 2019). Additionally, our analysis only included currently-working women, excluding anyone who stopped working before our study began. We focused on currently-working women to evaluate the relationship between work-plan changes and prenatal depression, since depression risk among women who had already stopped working could be impacted by changes in routine, financial stress (Thayer and Gildner 2020, in review), and other factors not directly related to anticipated work-plan changes. Additionally, while women qualitatively described working more/less during pregnancy due to the pandemic, this information was not systematically collected so was not included in the present analysis.

More research is needed to assess the effects of work-plan changes and uncertainty during COVID-19 in more diverse study populations, especially as Black and Latina women are more likely to hold low-wage occupations affected by COVID-19 (Harwood and Heydemann 2019). Moreover, populations who do not speak English or have reliable internet access may be particularly affected by the absence of in-person perinatal depression screens due to language/technology barriers (Onwuzurike et al 2020). Longitudinal research is also needed to establish directionality in the relationship between COVID-19-related work-plan changes and depression.

Our study found that COVID-19-related work-plan changes and work-plan uncertainty were associated with depression, independent of risk factors including income and education. These results suggest a need for increased mental health screening during the pandemic by providers. Additionally, increased access to FMLA/universal PFL may help reduce stress both during and after the pandemic.

Declarations

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Conflicts of Interest:

All authors have indicated they have no conflicts of interest relevant to this article to disclose.

Availability of Data and Material:

Study data are available from corresponding author upon reasonable request. Requests can be made through the CARE study website (<https://sites.dartmouth.edu/care2020/>)

Code Availability:

Study code are available from corresponding author upon reasonable request. Requests can be made through the CARE study website (<https://sites.dartmouth.edu/care2020/>)

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Tables

Table 1

Descriptive statistics. Mean (SD) reported for continuous variables, N (%) for categorical variables.

	Entire sample (N = 1600)	COVID-19 related change in work- plans (N = 473)	No COVID-19 related change in work-plans (N = 1,127)	p-value*
Age	31.6 (4.2)	31.1 (4.2)	31.8 (4.2)	0.004
Weeks pregnant	26.5 (9.1)	28.2 (8.7)	25.8 (9.1)	< 0.001
Race/ethnicity				0.25
White	1397 (87.3%)	411 (86.9%)	986 (87.5%)	
Hispanic/Latino	88 (5.5%)	30 (6.3%)	58 (5.2%)	
African American	23 (1.4%)	2 (0.4%)	21 (1.9%)	
Asian	55 (3.4%)	19 (4%)	36 (3.2%)	
American Indian/Alaska Native	8 (0.5%)	3 (0.6%)	5 (0.4%)	
Other	29 (1.8%)	8 (1.7%)	21 (1.9%)	
Household Income				< 0.001
\$<49,999	137 (8.6%)	65 (13.7%)	72 (6.4%)	
\$50–99,000	494 (30.9%)	159 (33.6%)	335 (29.7%)	
\$100,000+	969 (60.6%)	249 (52.6%)	720 (63.9%)	
Education				< 0.001
Less than a college education	284 (17.8%)	120 (25.4%)	164 (14.6%)	
College education	540 (33.8%)	152 (32.1%)	388 (34.4%)	
Degree beyond College education	776 (48.5%)	201 (42.5%)	575 (51%)	
Self-rated health				0.22
Poor/Fair	103 (6.4%)	36 (7.6%)	67 (5.9%)	
Good/Excellent	1,497 (93.6%)	437 (92.4)	1,060 (94.1%)	
High-risk pregnancy	560 (35%)	158 (33.4%)	402 (35.7%)	0.39
Previous birth	686 (42.9%)	199 (42.1%)	487 (43.2%)	0.67
Provider type				0.44
Obstetrician	1,309 (81.8%)	396 (83.7%)	913 (81%)	
Midwife	265 (16.6%)	70 (14.8%)	195 (17.3%)	
Other	26 (1.6%)	7 (1.5%)	19 (1.7%)	
Current work location [†]				< 0.001
Home	1,097 (73.6%)	235 (60.3%)	862 (78.3%)	
Outside home	296 (19.9%)	129 (33.1%)	167 (15.2%)	
Both in the home/outside the home	98 (6.6%)	26 (6.7%)	72 (6.6%)	

	Entire sample (N = 1600)	COVID-19 related change in work- plans (N = 473)	No COVID-19 related change in work-plans (N = 1,127)	p-value*
Depression symptoms (EPDS, 0–30)	10.5 (5.2)	11.9 (5.1)	9.9 (5.1)	< 0.001

*P-value represents significant differences in each variable according to whether or not COVID-19 affected women's work-plans. T-tests were used for continuous variables, chi-squared tests for categorical variables.

†N = 1448

Table 2

Regression results for association between work-plan changes and depression (Model 1) and uncertainty about work-plan changes and depression (Model 2).

	Model 1 (N = 1600)	Model 2 (N = 442)
	OR (95% CI)	OR (95% CI)
Work-plan change	1.74 (1.34–2.25)*	—
Uncertainty about work-plan change	—	2.70 (1.22–5.96)*
Provider type		
Obstetrician	REF	REF
Midwife	1.05 (0.75–1.47)	0.73 (0.39–1.40)
Other	0.93 (0.34–2.52)	1.89 (0.40–8.95)
Income		
\$<49,999	REF	REF
\$50–99,000	0.82 (0.52–1.29)	1.11 (0.54–2.26)
\$100,000+	0.79 (0.49–1.26)	1.25 (0.58–2.69)
Education		
Less than a college education	REF	REF
College education	0.84 (0.58–1.21)	0.60 (0.33–1.10)
Degree beyond College education	0.81 (0.56–1.17)	0.67 (0.37–1.21)
No previous birth	0.91 (0.71–1.18)	0.89 (0.56–1.43)
High risk pregnancy	1.09 (0.81–1.48)	1.28 (0.76–2.16)
Weeks pregnant	1.00 (0.98–1.01)	0.98 (0.96–1.01)
Maternal age	0.97 (0.94–1.01)	0.95 (0.89–1.01)
Current health		
Poor/Fair	REF	REF
Good/Excellent	0.27 (0.18–0.41)	0.35 (0.17–0.72)
Adjusted model R2	0.05	0.06

* p < 0.05