Changes in social support of pregnant and postnatal mothers during the COVID-19 pandemic

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ABSTRACT

Objective: Our objectives were to assess in perinatal women: the most effective methods used to meet social support needs during COVID-19, the impact of COVID-19 on self-reported social support levels, and how perceived change in social support related to distress, depression, and mental health.
Design: One-time survey administered from April to August 2020
Setting: Online
Participants: Pregnant and postpartum women with infants less than 6 months of age
Measurement and Findings: Participants indicated the methods they used to meet social support needs during COVID-19. They self-rated their social support level pre- and during pandemic and their distress, depressive symptoms, and mental health changes on a Likert scale. Out of 1142 participants, the most effective methods for obtaining social support during the pandemic were virtual means (e.g. video call) and interaction with friends. There was a significant difference in distribution of self-reported levels of social support before and during the pandemic, with more respondents reporting a decrease in support. Decreases in social support were associated with higher distress levels, higher levels of depressive symptoms, and poorer mental health.
Key Conclusions: Perinatal women reported decreased social support during the COVID-19 pandemic which was associated with poorer mental health. Using virtual means of social support and support provided by friends had the largest positive effect on perceived social support levels.
Implications for Practice: Interventions using virtual support means from friends may be helpful to improve social support and mental health in this population.

Introduction

The novel coronavirus (COVID-19), which causes acute respiratory illness, was first reported in Wuhan, China in December of 2019 and quickly spread throughout the rest of the world (Ioannidis, 2020; Paules et al., 2020). As of November 3rd, 2020, the United States had 9,268,818 total confirmed cases and 230,893 deaths. 930,628 of those cases were in the state of California and 514,566 cases were in the state of New York, over half of which were in New York City alone (CDC, 2020). The first "peak" of the pandemic occurred in New York in early April 2020, whereas the first "peak" of cases in California occurred mid-to-late July 2020 (CDC, 2020; Cummings et al., 2020). In addition to physical illness, COVID-19 may also have had a serious impact on mental health, especially in at-risk populations.

Preparing and caring for a new infant is inherently a time of change and transition. The perinatal period involves many physical, social, and

emotional changes related to the integration of a new child within the family and is associated with higher rates of mental health conditions in mothers (Robertson et al., 2004). Financial instability, changes in work and family routines, and fear for the safety of the child, self, and/or family members due to COVID-19 may have profoundly increased stress on the family. Pregnant individuals were particularly vulnerable to changes in pre-, peri-, or postnatal care as a result of policies aimed at reducing virus transmission (Czeisler et al., 2020, Chivers et al., 2020). During a time of personal change, the perinatal population had to adjust to many additional changes as a result of COVID-19.

Shelter-in-place orders and social distancing recommendations due to COVID-19 placed uncommon constraints on social interactions in the perinatal population (for example see Hendrix et. al., under review), the timing of which coincided with a period when these individuals may rely heavily on social support structures (Baker and Yang, 2018; Gabbe et al., 2017). During COVID-19, pregnant and postpartum women tended to decrease the size of their social circles to reduce disease transmission (Rhodes et al., 2020). In-person support groups and classes seemed to have experienced significant disruption, making the establishment of new connections and community with other mothers even more difficult. Also, social distancing guidelines imposed limitations on interactions otherwise typical to the perinatal period, such as post-birth celebrations and gatherings, of which many women felt significant loss (Chivers et al., 2020).

With social distancing recommendations, communication became largely virtual (Wiederhold, 2020). The effects of this shift are unknown. Virtual means of communication may make recognizing social cues and body language more difficult, and the overall frequency of conversation may be reduced (Wiederhold, 2020), which may have a negative effect on social support. On the other hand, a virtual communication program has been shown to increase perceived social support in a population of undergraduate students (Shaw and Gant, 2004), and it has been suggested as a method of support to consider during the COVID-19 pandemic (Allen, 2020). However, empirical data are lacking about ways in which social support changed, therefore it is challenging to isolate effective methods for bolstering social support.

Decreased support at a time of great need could negatively affect maternal well-being. Social support is protective for pre- and postnatal mothers in reducing negative birth experiences (East et al., 2019; Tani and Castagna, 2017; Zamani et al., 2019), reducing risk of depression (Xie et al., 2009; Zhong et al., 2018), supporting healthy postpartum diet and physical activity levels (Faleschini et al., 2019), and promoting mental wellbeing (Ginja et al., 2018). A lack of social support together with increased isolation throughout pregnancy and postpartum could therefore contribute to a host of negative maternal health outcomes including stress, anxiety, and depression.

In analyzing a sample of pregnant and postpartum women from diverse U.S. locations, the aims of this study were to: **1) describe how pregnant and postpartum women tried to meet their needs for social support during COVID-19 and assess the most effective methods used, 2a) compare social support before and during the pandemic, 2b) identify relationships between perceived change in social support and the distress level associated with the change**, and **3) determine how perceived change in social support relates to mental health.** By describing these changes and associations, our results can support implementation of policies and/or interventions aimed at improving the support systems of pregnant and postpartum women during times of crisis.

Methods

Participants and recruitment

This was a parallel study at the University of Southern California (USC) and New York University (NYU) Langone Health. Each site obtained independent approval from their respective Institutional Review Boards and conducted independent recruitment and data collection using the same study design. De-identified data were shared between sites for aggregate analyses.

Those who were either pregnant or gave birth within the past 6 months were invited to participate in the study.

At the USC site, initial contact with potential participants was made through social media ads and posts (Facebook, Twitter, Reddit, Instagram), websites (ResearchMatch.org, Craigslist, prenatal and postnatal blogs, University-affiliated websites for research recruitment), and email lists. Recruitment focused on potential participants in the greater Los Angeles area, however anyone with the link could fill out the survey. At the NYU site, medical records were used to identify potential participants from NYU Langone Health, who were then recruited via email, text, or telephone. Prospective participants accessed a link that led them directly to the survey landing page, which contained the study's informed consent form. Participants indicated their consent to participate in the study in order to proceed to the survey. Recruitment took place from April 7th to August 15th, 2020.

Survey

The survey was administered in REDCap in English and contained 76 questions total split into three sections. The survey took approximately 20-30 minutes to complete. Once completed, the participants could opt-in for a $20 Amazon gift card raffle. One gift card was raffled off per month for six months.

Section 1 of the survey covered screening for inclusion and exclusion criteria to participate in the study. Only participants who indicated they were either currently pregnant or had given birth less than 6 months ago were allowed to proceed. Section 2 was specific to pre- or postnatal mothers depending on the results of the initial screening. Section 2 contained questions related to pre- or postnatal experiences related to COVID-19 including birth experiences, support from medical care providers, and concerns about impact of COVID-19 on infant or maternal health. Section 3 was general to both pre- and postnatal individuals and covered COVID-19 exposure and symptoms, financial considerations, activity restrictions, coping, social support, and mental health. The full survey is provided as supplementary material in Appendix A. The survey questions were created by one site (NYU) in consultation with clinicians and researchers at multiple academic institutions, and then posted in a public repository (https://www.covgen.org/cope-surveys) to facilitate data harmonization across sites. Due to the time-sensitive nature of the study, the questions were created and distributed within a 3-week time period without external pilot testing.

This study focuses on social support and mental health questions. The questions analyzed here were chosen in collaboration with personnel from each site. The questions on social support methods covered: methods of social support used and persons or groups involved in providing support. The questions on social support rating questions covered: self-reported level of social support prior to and during COVID-19 and self-rated distress level corresponding to changes in social support. The questions for mental health covered depressive symptoms, self-rated changes in stress and mental health, and overall level of stress due to COVID-19. Depressive symptoms were assessed using five items from the depression subscale of the Brief Symptom Inventory (BSI), where users rate their symptoms using a Likert scale (0 = no symptom at all, 4 = extreme level of symptom) and an average is taken. Higher scores indicate higher levels of depressive symptoms. Normative values for the healthy population have been reported at 0.28 (Derogatis and Melisaratos, 1983). The internal consistency of the mental health scale for our sample ($\alpha = 0.750$) was congruous with the published internal consistency for the depression subscale of the BSI ($\alpha = 0.71$ - 0.85; Derogatis and Melisaratos, 1983; Khalil et al. 2011). All questions used for analysis are provided in **Table 1**.

Table 1
Survey questions included in the data analysis for the present study.

Social Support Methods
- How are you currently trying to meet your needs for social support? (Check all that apply)   - Phone calls   - Electronic communication (e.g. email, text)   - Virtual (e.g. video call such as FaceTime)   - In-person   - Social Media (Facebook, Instagram)   - Other   - Open field
- Who are you receiving social support from? (Check all that apply)   - Family   - Friends   - Neighbors   - Religious community   - Mental health care provider   - Health care provider   - Nonprofit and community organizations   - Other   - Open field

Social Support Rating
- Prior to COVID-19, how supported do you feel by your social network?   - Likert scale 1-7; 1 = not well supported, 7 = very well supported
- Currently, how supported do you feel by your social network?   - Likert scale 1-7; 1 = not well supported, 7 = very well supported
- In general, what is the level of distress you have experienced with disruptions to your social support due to the COVID-19 outbreak?   - Likert scale 1-7, 1 = no distress, 7 = high distress

Mental Health (Cronbach's α = 0.750)
Depression subscale of Brief Symptom Inventory In the past 7 days, including today, how often were you distressed by: - Feeling no interest in things   - Feeling lonely   - Feeling blue   - Feeling of worthlessness   - Feeling hopeless about the future   - Response options: - Not at all = 0   - A little bit   - Moderate   - Quite often   - Extremely = 4
- How has the COVID-19 outbreak changed your stress levels or mental health?   - Improved them significantly = 1   - Improved them moderately   - No change   - Worsened them moderately   - Worsened them significantly = 5
- Overall level of stress related to the COVID-19 outbreak   - Likert scale 1-7, 1 = nothing, 7 = extreme

Data analysis

Because the goal of our study was to determine the effects of COVID-19 on social support within the United States and not to compare separate geographical locations, data from the two sites (NYU, USC) were aggregated into one group analysis in this manuscript. Analyses separated by site are available in **Appendix B**. Responses from pre- and postnatal women were also pooled for aggregate analysis.

Only participants who completed every survey question in Table 1 were included for analysis. $n = 174$ filled out for the consent form for the study but did not start the survey, and $n = 64$ were excluded due to incomplete datasets. In order to confirm fidelity of survey responses, we also excluded data for any participant that provided a date outside of the expected range (for example, a child's birth date that was in the future or over six months prior to the survey date), $n = 3$.

Statistical methods

We first assessed the data for normality. Our data had skewness and kurtosis values of $>|1|$ and the difference between the median and mean was $>20\%$ for all variables, indicating non-normal distribution. The Kolmogorov-Smirnov and Shapiro-Wilk tests were also statistically significant for all variables and data to be presented in the analysis ($p < 0.001$). Therefore, all of our data are reported in median and interquartile range (IQR), and we performed non-parametric statistical tests for our analyses.

For Aim 1, evaluating the most effective methods used to meet social support needs during COVID-19, we performed a Mann-Whitney U test to examine differences in self-reported social support ratings during COVID-19 between those who used the method and those who did not. We calculated an effect size (η^2) from the Mann-Whitney U z-statistic and sample size n using the equation: $\eta^2 = z^2 \, / \, n$.

For Aim 2a, comparing social support before and during the pandemic, we compared the distribution of social support Likert scale responses before and during the pandemic using the Pearson's Chi square (χ^2) test for independence.

For Aim 2b, identifying relationships between the amount of perceived change in social support and the distress level associated with the change, we calculated the difference in social support Likert values during the pandemic compared to pre-pandemic. Positive values therefore represent increased social support, negative values represent decreased support, and zero represents no change from pre- to during pandemic. We created an ordinal variable that was equal to 1 if the participant reported an increase in social support, 0 if there was no change, or -1 if they reported a decrease in social support. We then used the Pearson's Chi square test to determine whether changes in social support were associated with distress level from social support disruptions.

For Aim 3, determining how perceived change in social support was related to mental health, we used Spearman's correlation coefficient (r_s) to test for a monotonic relationship between 1) change in social support and 2) distress due to disruption in social support and 1) depressive symptoms and 2) change in stress or mental health. We performed partial rank correlations to examine these associations, with and without adjustment for a priori potential confounders of overall level of stress due to COVID-19, maternal age, household income, education, and data collection site. Statistics were performed in SPSS 26.0 using $\alpha = 0.05$ for significance tests.

Results

Demographics

Between April and August, 2020, 649 pregnant and 493 postpartum mothers with infants under the age of 6 months participated in the survey for a total of 1142 participants. 322 of the participants' data were collected from the USC site and 820 were collected from the NYU site. The demographic characteristics of our whole sample, $n = 1142$, are shown in **Table 2**.

Effectiveness of social support methods

During the COVID-19 pandemic, most pregnant or postpartum individuals tried to meet their social support needs almost equally through phone, electronic (e.g. email, text), or virtual (e.g. video call) means

Table 2
Demographic characteristics of survey participants.

	Demographic Characteristic	n (%), unless otherwise indicated
Perinatal Status	Pregnant	649 (56.8%)
	Postpartum (<6 months)	493 (43.2%)
Ages	Median (IQR) maternal age, overall	33 (30 – 36)
	Median (IQR) child age, in months, postpartum women	2.10 (1.02 – 3.53)
	Median (IQR) gestational age, in weeks, pregnant women	25.76 (19.07 – 32.88)
Maternal Education	High school or less	70 (6.1%)
	Trade school Partial college 2-year college	146 (12.8%)
	4-year college	356 (31.2%)
	Graduate degree	569 (49.8%)
	Unknown	1 (0.1%)
Marital Status	Single	67 (5.9%)
	Married	1062 (93.0%)
	Divorced	10 (0.9%)
	Other	3 (0.3%)
Race/Ethnicity	Black or African American	110 (9.6%)
	Native American/Alaskan Native	8 (0.7%)
	Native Hawaiian/Pacific Islander	7 (0.6%)
	Asian	118 (10.3%)
	Hispanic/Latin	150 (13.1%)
	White	763 (66.8%)
	Other	41 (3.6%)
	Decline to Answer	27 (2.4%)
Household Income	Less than $60,000	257 (22.5%)
	$60,000 to $120,000	289 (25.3%)
	$120,000 to $180,000	232 (20.3%)
	$180,000 to $250,000	300 (26.3%)
	Greater than $250,000	59 (5.2%)
	Decline to answer	5 (0.4%)
Total Participants		1142

Table 3
Summary of social support methods used and comparison of social support rating during COVID-19 between those who used each social support method and those who did not.

Social Support Method	Used? Yes/No	n (%)	Social Support Rating Median (IQR)	η^2	p-value
Phone	Yes	901 (78.9%)	5 (4 – 7)	0.018	$p < 0.001$
	No	241 (21.1%)	5 (3 – 6)		
Electronic (e.g. email, text)	Yes	908 (79.5%)	5 (4 – 6)	0.007	$p = 0.006$
	No	234 (20.5%)	5 (4 – 6)		
Virtual (e.g. video call)	Yes	907 (79.4%)	5 (4 – 7)	0.027	$p < 0.001$
	No	235 (20.6%)	5 (3 – 6)		
In-person	Yes	243 (21.3%)	6 (5 – 7)	0.014	$p < 0.001$
	No	899 (78.7%)	5 (4 – 6)		
Social media (Facebook, Instagram)	Yes	728 (63.7%)	5 (4 – 6)	0.004	$p = 0.042$
	No	414 (36.3%)	5 (4 – 6)		
Who Provides Support	**Used? Yes/No**	**n (%)**	**Social Support Rating Median (IQR)**	**η^2**	**p-value**
Family	Yes	1093 (95.7%)	5 (4 – 6)	0.019	$p < 0.001$
	No	49 (4.3%)	4 (2 – 5)		
Friends	Yes	1011 (88.5%)	5 (4 – 7)	0.029	$p < 0.001$
	No	131 (11.5%)	4 (3 – 6)		
Religious community	Yes	146 (12.8%)	6 (5 – 7)	0.005	$p = 0.015$
	No	996 (87.2%)	5 (4 – 6)		
Mental health care provider	Yes	159 (13.9%)	5 (4 – 6)	0.001	$p = 0.284$
	No	983 (86.1%)	5 (4 – 6)		
Health care provider	Yes	163 (14.3%)	6 (4 – 7)	0.005	$p = 0.022$
	No	979 (85.7%)	5 (4 – 6)		
Nonprofit and community organizations	Yes	40 (3.5%)	6 (5 – 7)	0.003	$p = 0.068$
	No	1102 (96.5%)	5 (4 – 6)		

(more than 78%), while only approximately one in five used in-person support (**Table 3**). Most of our sample received social support from family and friends (> 88%), and less than 15% reported receiving support from physical or mental health care providers, religious, or community organizations.

Participants who used each social support method had significantly higher self-reported social support ratings during COVID-19 than those who did not, indicating that individuals felt more supported when they engaged in any of the methods (**Table 3**). Phone, virtual, and in-person means of support had small effect sizes ($\eta^2 > 0.01$), with virtual support such as video calls having the largest effect of all the methods ($\eta^2 > 0.027$), suggesting that virtual support is the most effective method for this group.

Participants that received support from family, friends, religious communities, or health care providers had significantly higher self-reported social support ratings during COVID-19 than those who did not. Those who received support from mental health care providers and nonprofit/community organizations did not have significant differences in social support ratings. Support from family and friends had small effect sizes ($\eta^2 > 0.01$), with support from friends having the largest effect ($\eta^2 = 0.029$) (**Table 3**). This suggests that friends were most effective at making participants feel supported.
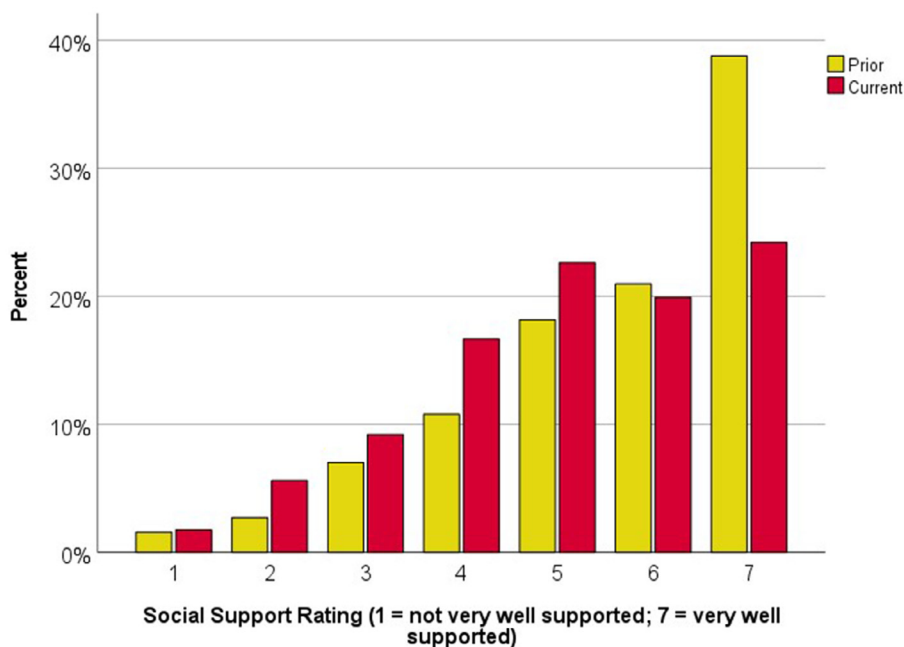
Fig. 1. Social support rating of perinatal women clustered by prior and current levels of social support. The x-axis represents self-reported levels of social support on a Likert scale. The y-axis represents the percentage of respondents for each option. Overall, social support levels were higher before than during the COVID-19 pandemic.
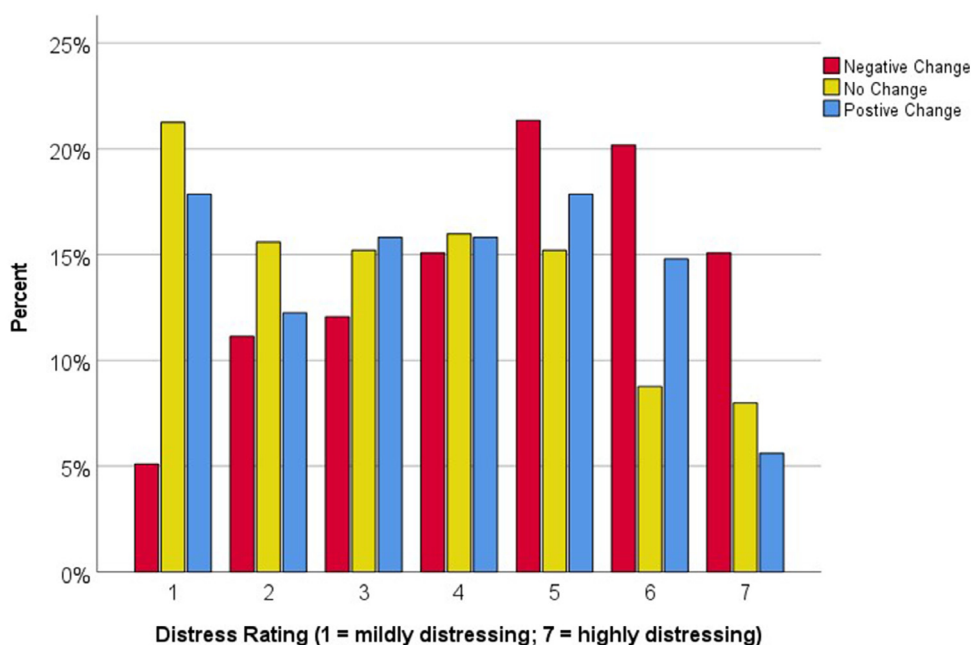

Fig. 2. Distress rating of perinatal women related to changes in social support, clustered by change in social support comparing pre- and during pandemic. The x-axis represents self-reported distress levels due to disruptions to social support on a Likert scale. The y-axis represents the number of respondents for each option. Overall, respondents with higher distress levels tended to have decreased social support.

Change in social support ratings

There was a statistically significant difference between distribution of self-reported levels of social support before the pandemic and during the pandemic (Pearson's $\chi^2 = 73.695$, $df = 6$, $p < 0.001$). Upon examination of the distributions, our sample tended to report higher social support ratings prior to the pandemic compared to during the pandemic (Fig. 1). Overall, 196 participants (17.2%) reported increased social support due to the pandemic, 432 participants (37.8%) reported decreased support, and 514 participants (45.0%) reported no change.

Perceived change in social support (increased, decreased, or no change) was significantly associated with distress related to change in social support (Pearson's $\chi^2 = 92.680$, $df = 9$, $p < 0.001$). Upon examination of the distributions, those who had lower distress generally

experienced no change in or increased social support. Those who had higher distress generally experienced reduced social support (Fig. 2).

Correlation between change in social support and maternal mental health

After controlling for overall level of stress due to COVID-19, maternal age, household income, education, and data collection site (Table 4), we found weak but significant correlations between change in social support and depressive symptoms (Spearman's $r = -0.098$, $p = 0.002$), and between change in social support and change in stress levels or mental health due to the COVID-19 pandemic ($r_s = -0.065$, $p = 0.041$). Specifically, reduced social support was correlated with higher levels of depressive symptoms and worsened stress levels or mental health. Overall, our participants reported fairly average levels of depressive symptoms (me-

Table 4

Correlation statistics between change in social support and distress level (correlation variable 1) and depressive symptoms and change in stress levels or mental health (correlation variable 2). Raw results represent correlation statistics without controlling for covariates. Adjusted results reflect controlling for the following covariates: overall level of stress due to COVID-19, maternal age, household income, education, and data collection site.

Correlation Variable 1	Correlation Variable 2	Result (Raw)	Result (Adjusted)
Change in social support	BSI: Depression subscale	r_s = -0.114 p < 0.001	r_s = -0.098 p = 0.002
Change in social support	Change in stress levels or mental health	r_s = -0.093 p = 0.001	r_s = -0.065 p = 0.041
Distress due to disruption in social support	BSI: Depression subscale	r_s = 0.335 p < 0.001	r_s = 0.165 p < 0.001
Distress due to disruption in social support	Change in stress levels or mental health	r_s = 0.306 p < 0.001	r_s = 0.050 p = 0.117

dian = 0.4, IQR = 0.2-1.2, **Supplemental Table 1**) although the range of scores indicates some women had more symptoms. Normative values for the healthy population have been reported at 0.28 (Derogatis and Melisaratos, 1983).

Controlling for overall level of stress due to COVID-19, maternal age, household income, education, and data collection site, we also found a significant correlation between distress related to disruptions in social support and depressive symptoms (r_s = 0.165, p < 0.001), but no correlation between distress related to disruptions in social support and change in stress levels or mental health due to the COVID-19 pandemic (r_s = 0.050, p = 0.117). Higher distress ratings were correlated with higher levels of depressive symptoms.

Discussion

In this study, we analyzed social support in a perinatal population during the COVID-19 pandemic. We found that while participants used phone, electronic (email, text, etc.) and virtual means (video chat) to a similar extent during the pandemic, virtual means had the largest effect on perceived social support. Participants primarily relied on family and friends, and individuals who socialized with friends tended to feel more supported. Overall, the perinatal population generally experienced no change or reduced social support during the COVID-19 pandemic. Reduced support was associated with higher distress related to social support disruptions and with higher levels of depressive symptoms and worsened stress level and mental health.

These findings are consistent with mental health research during the COVID-19 pandemic. Reduced social support due to the pandemic is not isolated to the perinatal population (Davenport et al., 2020) but is evident among children and adolescents (Loades et al., 2020), elderly adults (Giebel et al., 2021), students (Szkody et al., 2020), and healthcare workers (Labrague and De Los Santos, 2020; Spoorthy et al., 2020). Among adults between the ages of 18-34, lower levels of social support were significantly associated with higher depression risk and lower sleep quality (Grey et al., 2020). Szkody et al. (2020) also found that greater perceived social support reduced worry about COVID-19 and improved psychological health. The present findings further solidify the widespread presence of decreased social support among another vulnerable population: perinatal women.

Decreased social support can have a profound impact on expecting or new mothers, placing them at higher risk for postpartum depression (Xie et al., 2009; Zhong et al., 2018), negative birth experiences (East et al., 2019; Tani and Castagna, 2017; Zamani et al., 2019), and a number of other physical and mental health consequences (Faleschini et al., 2019; Ginja et al., 2018). Given that 37.8% of our sample had a reduction in perceived social support, a large portion of our sample are at greater risk for negative physical and mental health consequences due to the COVID-19 pandemic.

Not only does prenatal and postnatal stress have a negative impact on maternal health, it is also associated with a wide range of adverse psychosocial and health outcomes in children. Mothers with increased psychological or physiological stress during pregnancy expose their fetus to heightened stress-related hormones, which can have lasting effects. Studies have suggested associations between maternal stress and changes in limbic and frontotemporal networks of the fetal brain, which is associated with anxiety, negative affect, and mood disorders later in life (Lautarescu et al., 2020). Exposed children can also present with impaired cognitive development, emotion dysregulation, and behavioral problems over time (Glover, 2014; Lautarescu et al., 2020).

We therefore encourage the implementation of prevention or intervention strategies to reduce the negative impact of decreased social support on perinatal women and future generations. The present results identified that the most effective social supports methods were virtual (e.g., video call) and from friends. We therefore encourage perinatal women to schedule regular video calls with friends or family when in-person meetings are not possible to improve mental health.

Respondents who received support from health care providers had higher self-reported social support ratings during the pandemic than those who did not. While the effect size is small, this has important implications for the role of health care providers. First, maternity and postpartum care providers can identify and promote themselves as part of the social support structure for perinatal women. They can also encourage their patients to schedule regular video calls; our results suggest that virtual support is the most effective method for this group. Finally, they can encourage formal interventions that utilize virtual or peer support to increase the perceived social support of this population.

Interventions used during COVID-19 to improve social support have employed video calls and peer support. Examples of interventions include telehealth home support for older adults (Goodman-Casanova et al., 2020) and peer support and crisis intervention for healthcare workers (Cheng et al., 2020). Similar methods of virtual peer support may also benefit those who are pregnant or postpartum. Surprisingly, talking with a mental health care provider did not translate to higher self-reported social support levels in our sample of perinatal women; in fact, those who used mental health care providers for support in the USC sample had significantly lower social support ratings than those who did not (see **Appendix B, Table B.2.a**). One possibility is that women with lower social support ratings were more likely to seek professional help. Yet, both group and individual psychoeducation and therapeutic conversation with a mental health care professional have been shown to reduce stress and anxiety among pregnant women prior to the COVID-19 pandemic (Striebich et al., 2018). Additional research is needed to evaluate the effectiveness of such interventions when they are implemented virtually or in the broader context of chronic and uncertain stress. At this time, no group has investigated an intervention to improve support for perinatal women during the COVID-19 pandemic, but this research is critical to determining whether established interventions continue to be effective in novel environmental contexts such as during global pandemics.

Our study has several limitations that warrant discussion. One limitation is that questions about pre-pandemic social support were asked retrospectively and therefore may be influenced by recall bias. This was a self-report observational study, so it is also possible that our participants would have interpreted the questions differently than we intended, and that some results may be attributed to factors other than the COVID-19 pandemic. In addition, our sample reflected a portion of the perinatal population that was generally older, identified as white, and was of higher socioeconomic status, so our findings may not apply

to younger mothers, underrepresented races, or those of lower socioeconomic status. Given that minority races and those of lower socioeconomic status tend to have higher rates of COVID-19 transmission and death (Hawkins et al., 2020), their mental health data may also be different than the data presented here. Lastly, we did not have a control group of non-pregnant or postpartum individuals, so we cannot be sure that these findings are not related to pregnancy or postpartum status, and we do not know how our findings compare to the general population. Despite these limitations, our study was able to collect and analyze a large sample of perinatal health data during an unprecedented crisis and suggest ways to bolster social support in a vulnerable population. Our inclusion of general COVID-19 stress is another strength of the study because it allows us to better isolate the influence of social support changes on maternal mental health.

In conclusion, our results showed that the initial course of the COVID-19 pandemic from April to August 2020 resulted in significantly decreased social support for pregnant and postpartum individuals. Decreased social support was correlated with higher levels of depressive symptoms and worsened stress and mental health, which has implications for fetal/child development. Despite these negative implications, we also found that using virtual means of social support and support provided by friends had the largest positive effect on perceived social support levels during COVID-19. We advocate for implementation and research on interventions to improve social support and mental health in this population, such as telehealth home support and peer support groups, for current and future pandemics.

Ethical Approval

This was a parallel study at the University of Southern California (USC) and New York University (NYU) Langone Health. Each site obtained independent approval from their respective Institutional Review Boards prior to initiation of data collection.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.midw.2021.103162.

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