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Early effects of the COVID-19 pandemic on fertility preferences in the United States: an exploratory study

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Objective: To explore early disparate impacts of the COVID-19 pandemic on fertility preferences

Design: Cross-sectional study

Setting: Online survey questionnaire

Patient(s): A total of 440 female participants who were trying to conceive (TTC) in the past year or currently are TTC.

Intervention(s): No interventions administered.

Main Outcome Measure(s): Change in fertility preference

Result(s): Approximately 1 in 3 participants reported changing their fertility preferences because of the COVID-19 pandemic. Of those that reported changing their fertility preferences, 23.9% reported TTC earlier and 61.6% reported TTC later. Preliminary findings show the odds of changing fertility preferences in black or African American women were 5.45 (95% confidence interval [CI], 1.50–19.90) times that of white women and in nonheterosexual women were 2.76 (95% CI, 1.41–5.42) times that of heterosexual women. Furthermore, every 1 unit increase in state anxiety and depressive symptoms was associated with a 26% (95% CI, 3%–54%) or 17% (95% CI, 5%–31%) increase in odds of pushing back TTC, respectively.

Conclusion(s): This exploratory study highlights how the fertility preferences of racial and ethnic minorities, sexual minorities, and those experiencing mental health issues may be disparately influenced by the pandemic. Research is needed to examine further the disparate effect of the COVID-19 pandemic on fertility preferences. (Fertil Steril® 2021;116:1128–38. ©2021 by American Society for Reproductive Medicine.)

El resumen está disponible en Español al final del artículo.

Key Words: Coronavirus, COVID-19, pandemic, fertility preference, disparity
pandemic. On the other hand, both studies also found 10%–20% of their participants who did not previously intend for a child now reported wanting a child or wanting to have a child sooner because of the pandemic (5, 6). Therefore, the COVID-19 pandemic seems to be leading to conflicting changes in fertility preferences.

These inconsistencies could be in part because of demographic, socioeconomic, and health disparities that are becoming exacerbated by the pandemic. For example, a recent study conducted in the United States in the spring over the week of April 30–May 6, 2020 found that among 2,009 cisgender women between 18 and 49 years of age who were sexually active in the United States, black and Hispanic women, in comparison to white women, were more likely to report wanting to have children later or wanting fewer children because of the pandemic (6). Queer women compared with straight women and lower-income women compared with higher-income women also reported similar changes in fertility preference (6). These findings suggest that the fertility preferences of socially disadvantaged groups, such as racial/ethnic minorities, sexual minorities, and low-income populations, may be disproportionately affected by the COVID-19 pandemic. However, this previous study focused on adult women, regardless of prepandemic pregnancy intentions (6). Therefore, it is unclear whether the disparate influence of the COVID-19 pandemic on fertility preferences also exists among those who were TTC.

In March and April of 2020, various medical professional societies in the United States, as well as state and local governments, recommended the limitation of nonemergency medical care to prioritize health care resources for those caring for COVID-19 patients (7). However, people who were TTC before the pandemic may already have begun altering their lifestyle, health behaviors, and finances, and seeking medical care to prepare for the future child. Thus, the impact of the COVID-19 pandemic on fertility preferences may have been heightened further among those who were TTC (8). Identifying disparities in this group is especially important so that the clinical providers can be aware of those who may need extra support and care on their “TTC journey” during the pandemic.

This exploratory study investigated the early impact of the COVID-19 pandemic (between May 2020 and July 2020) on the fertility preferences of people who were TTC in the past year or currently are TTC. We explored the potential disparate impact of the COVID-19 pandemic on fertility preferences by examining differences in demographic characteristics, financial status/access to health care, COVID-19–related experiences, and physical, reproductive, and mental health by comparing those who did or did not change their fertility preferences because of the pandemic (Aim 1). Then, among those who reported changing their fertility preferences, we examined differences in demographic characteristics, financial status/access to health care, COVID-19–related experiences, and physical, reproductive, and mental health comparing those who chose to try to conceive later than previously intended and those who chose to try to conceive earlier than previously intended because of the pandemic (Aim 2).

**MATERIAL AND METHODS**

**Study Design**

The University of Southern California “Trying to Conceive during COVID-19” study explored how the COVID-19 pandemic affected people’s fertility preferences in the United States. An online survey was completed between May 15, 2020, and July 13, 2020 via the survey platform Qualtrics (Qualtrics, Provo, UT) in English. The survey began with an online screening form, where all potential participants answered questions pertaining to the inclusion criteria. Then, the eligible participants were provided with an informed consent sheet asking for an electronic signature. On completion of the survey, the participants were entered into a lottery to win one of twenty $40 gift cards. The institutional review board at the University of Southern California approved all aspects of this study (UP-20-00390).

**Recruitment and Participants**

An online convenience sampling strategy was used to recruit adults living in the United States during the COVID-19 pandemic. The study was promoted through social media platforms (e.g., Instagram, Facebook, Reddit, Twitter, and LinkedIn), email list servers for universities and academic societies, and online message boards focused on fertility and conception. Inclusion criteria for recruitment were as follows: living in the United States; age of 18 years or older; biological sex at birth as female; currently not pregnant; and TTC in the past year or currently TTC.

**Measures**

**Demographics.** The participants reported their age, ethnicity, race, sex, sexual orientation, highest level of education attained, marital status, household size, and number of children. These measures were included in the study as previous studies have found that one’s fertility preferences and reproductive health significantly differ by these demographic factors (9–13). For example, unmarried women, more educated women, older women, and women with higher number of children are less likely to want more children (9, 10), nonheterosexual women are less likely to receive clinical contraceptive counseling (11), and white women and those with higher socioeconomic status are more likely to receive fertility treatment (12, 13).

**Financial status/access to health care resources.** The participants were asked to report their annual household income, employment status, current health insurance status, and access to parental leave (i.e., family leave or maternity leave). Parental leave was defined as the right for employees with 12 months’ service to take up to 18 weeks of unpaid leave to care for a child before the child’s 18th birthday. People who are employed, have health insurance coverage, and report higher income are more likely to use reproductive health
Anxiety and depressive symptoms (8). Increased perceived stress is associated with decrease in fertility intention (measured via the fertility intention scale developed by Li et al. [16]), whereas increased social support from family and friends is positively associated with fertility intention (17). Qualitative studies also have found higher anxiety in general, specifically about financial issues, and these issues decrease people’s desire for more children (18), and changes in fertility treatment are correlated with both anxiety and depressive symptoms (8).

**Mental health and social support.** Four separate mental health-related measures were included in the survey as these measures are known correlates of fertility preferences. Increased perceived stress is associated with decrease in fertility intention and income (e.g., natural conception or assisted reproductive technology [ART]) before the pandemic and currently. In addition, the participants shared whether their fertility preferences changed or remained unchanged because of the COVID-19 pandemic. If the participants answered that their preferences changed, they then answered how they were altered, such as “Sped up timeline (TTC earlier than previously intended),” “Pushed back timeline (TTC later than previously intended),” “Made permanent decision to stop TTC,” “Try an alternative way to TTC,” or “Other.”

**Statistical Analysis**

All statistical analyses were conducted using SAS v9.4 (30). First, we examined the descriptive statistics. Then, we conducted a variable screening process via $\chi^2$ tests or Fisher’s exact test (when the $\chi^2$ test assumption was not met) and Student’s $t$ tests to compare participant characteristics between those who reported not changing or changing their fertility preferences because of the pandemic.

To build the exploratory stepwise logistic regression model, we took a hybrid qualitative and quantitative approach to model building by considering findings from currently available research on the pandemic’s disparate impact on fertility preferences and findings from our data-driven variable screening process. We first began with including demographic variables (race, sexual orientation, and income) that have been identified explicitly by Lindberg et al. (6) as key variables that drive the differential effect of the COVID-19 pandemic on fertility preferences in the United States. Then, in a stepwise fashion, we included other variables associated with change in fertility preferences ($P<.1$) that were identified on the basis of the variable screening process. The traditional choice of significance level for variable selection in a stepwise model is either 0.05 or 0.10 (31, 32). Given the exploratory nature of this study, we considered the higher significance level for variable selection so that the potential variables relevant to the outcome were not missed and to avoid eliminating variables that may be less significant but carry practical and clinical implications (33).

We then repeated these steps in the subset of participants that reported changing their fertility preferences to examine differences in the participant characteristics between those who were TTC later than previously intended compared with those TTC earlier.

**RESULTS**

**Data Availability and Participant Characteristics**

A total of 552 potential participants clicked on the survey link and began the online screening form. On the basis of the screening, 74 did not meet the inclusion criteria and 478 filled
out the questionnaire. We dropped 3 duplicate observations, 25 participants who failed to complete 50% of the questionnaire, and 10 responses with suspected poor data quality, where participants completed the questionnaire in less than 5 minutes (n = 4) or participants reported discrepant answers by marking the first/last answer for the entire questionnaire (n = 6). The final sample for Aims 1 and 2 consisted of 440 participants. For Aim 3, we conducted the analyses in the subset of participants who reported speeding up or pushing back TTC (n = 104).

Of the 440 participants, 368 (83.6%) completed the questionnaire in its entirety on average 13.9 minutes. The full consort diagram can be found in Figure 1.

**Descriptive Statistics**

Descriptive statistics of the participants can be found in Table 1. The participants in this study ranged from 21–44 years, with an average age of 30.9 years (SD = 3.5). Most of our participants identified as not Hispanic (90.0%), female (98.4%), and heterosexual (85.6%). The majority of our participants identified as white (83.0%); followed by 9.7% Asian, Native Hawaiian, or Pacific Islander; 3.9% black or African American; and 3.5% American Indian, Alaska Native, or Other. This study population reported very high socioeconomic status, with more than half (55.2%) of our participants having attained a graduate degree and the majority (76.6%) were full-time employees with an annual household income above $100,000 (63.0%). Most of our participants were married (92.7%), currently had no children (79.1%), and lived in a household of two (74.3%). Most also reported having health insurance (98.4%) and parental leave (73.4%).

In this study, the mean score for the State-Trait Anxiety Inventory-6 was 46.9 (SD = 10.1). This score was higher than previously documented averages for adult women, which ranged between 37.1 and 39.9 (34). The average CESD-10 score was 10.8 (SD = 5.9), with more than half (54.8%) of the participants classified as having clinically relevant depression (CESD-10 of ≥10). This score also is above the average CESD-10 score of 4.97 and average 10% prevalence of depression documented in previous large scale studies of adult women in the United States (35). However, a recent study reviewing the impact of COVID-19 pandemic on mental health has found the average prevalence of anxiety-related symptoms to have increased from 6.33% to 50.9% and depressive symptoms to have increased from approximately 14.6% to 48.3% (36). Average PSS-4 score was 6.7 (SD = 2.8), which is comparable to the population norm for the PSS-4 score of 6.11 (SD = 3.14) in an English-speaking sample (37). The average Interpersonal Support Evaluation List score was 40.3 (SD = 5.8), which is comparable to previously reported mean scores ranging from 30–45 (38, 39).
Most of our participants reported good perceived health status (52.8%) and did not have any chronic medical conditions known to increase the risk of COVID-19 infection (85.2%). Approximately 1 in 10 participants had tested positive or reported COVID-19 symptoms, and less than 1% were hospitalized for COVID-19 symptoms. Approximately 30% of the participants had isolated or quarantined themselves because of possible exposure, COVID-19 symptoms, or existing health conditions. Approximately 1 in 4 participants reported that their close family member was isolated or quarantined due to the pandemic, and 17.8% reported that their close family member tested positive or showed COVID-19 symptoms.

More than half of our participants (59.3%) had been TTC for 1–6 months, 24.6% had been TTC for 6–12 months, and 16.1% had been TTC for >1 year. Most of our participants were TTC naturally before the pandemic (72.2%), and this rate increased during the pandemic (82.1%). The prevalence of ART did not change from before the pandemic (12.3%) to

| Variables                                      | (n, row %) or (mean, SD) |
|------------------------------------------------|--------------------------|
| Demographics                                   |                          |
| Age                                            | 30.9 (3.5)               |
| Ethnicity                                      |                          |
| Hispanic                                       | 44 (10.1%)               |
| Not Hispanic                                   | 394 (90.0%)              |
| Race                                           |                          |
| White                                          | 360 (83%)                |
| Black or African American                      | 17 (3.9%)                |
| Asian, Native Hawaiian, or Pacific Islander    | 42 (9.7%)                |
| American Indian, Alaska, Native, or Other      | 15 (3.5%)                |
| Sex                                            |                          |
| Female                                         | 433 (98.4%)              |
| Not Female                                     | 7 (1.6%)                 |
| Sexual orientation                             |                          |
| Heterosexual                                   | 376 (85.5%)              |
| Not Heterosexual                               | 64 (14.6%)               |
| Highest education attained                     |                          |
| High school                                    | 2 (0.5%)                 |
| Some college                                   | 30 (6.8%)                |
| Associate degree (2 year)                      | 10 (2.3%)                |
| Bachelor’s degree (4 year)                     | 155 (35.2%)              |
| Graduate degree                                | 243 (55.2%)              |
| Marital status                                 |                          |
| Married/domestic relationship                  | 408 (92.7%)              |
| Cohabiting, but not married                    | 21 (4.8%)                |
| Single, divorced, separated                    | 11 (2.5%)                |
| Household size                                 |                          |
| 1                                              | 9 (2.1%)                 |
| 2                                              | 326 (74.3%)              |
| 3                                              | 74 (16.9%)               |
| 4                                              | 18 (4.1%)                |
| 5 or more                                      | 12 (2.7%)                |
| No. of children                                |                          |
| None                                           | 348 (79.1%)              |
| 1                                              | 74 (16.8%)               |
| ≥2                                             | 18 (4.1%)                |
| Financial status/ access to health care resources |                      |
| Annual household income <$50,000               | 49 (11.1%)               |
| $50,000–$99,999                                | 114 (25.9%)              |
| $100,000–$149,999                             | 136 (30.9%)              |
| >$150,000                                     | 141 (32.1%)              |
| Employment status                              |                          |
| Full-time employee                             | 337 (76.6%)              |
| Part-time employee                             | 17 (3.9%)                |
| Self-employed                                  | 19 (4.3%)                |
| Student/trainee                                | 21 (4.8%)                |
| Unemployed                                     | 38 (8.6%)                |
| Other                                          | 8 (1.8%)                 |
| Health insurance                               |                          |
| Currently insured                              | 431 (98.4%)              |
| Not currently insured                          | 7 (1.6%)                 |
| Parental leave                                 |                          |
| Yes                                            | 323 (73.4%)              |
| No                                             | 82 (18.6%)               |
| Do not know                                    | 35 (8%)                  |
| Mental health                                  |                          |
| Trait anxiety (Spielberger State-Trait Anxiety Inventory-6 Prorated) | 46.9 (10.1) |
| Depressive symptoms (Center for Epidemiologic Studies Depression-10) | 10.8 (5.9) |

TABLE 1

Descriptive characteristics of 440 participants.

TABLE 1

Continued.

| Variables                                      | (n, row %) or (mean, SD) |
|------------------------------------------------|--------------------------|
| Perceived stress (Perceived Stress Scale-4)    | 6.7 (2.8)                |
| Social support (ISEL)                          | 40.3 (5.8)               |
| Physical health                                |                          |
| Perceived health status                        |                          |
| Good                                           | 210 (52.8%)              |
| Fairly good                                    | 113 (28.4%)              |
| Average                                        | 67 (16.8%)               |
| Fairly poor                                    | 8 (2%)                   |
| Chronic medical conditions                     |                          |
| None                                           | 375 (85.2%)              |
| At least 1                                     | 65 (14.8%)               |
| COVID-19-related experiences                  |                          |
| Isolation/quarantine                          |                          |
| Not isolated or quarantined                    | 307 (69.8%)              |
| Isolated or quarantined                        | 133 (30.2%)              |
| Family isolation/quarantined                   |                          |
| Not isolated or quarantined                    | 339 (77.1%)              |
| Isolated or quarantined                        | 101 (23.0%)              |
| Symptoms/tests                                 |                          |
| No symptoms or positive test                   | 391 (88.9%)              |
| COVID-19 symptoms or tested positive           | 49 (11.1%)               |
| Medical/Hospital                               |                          |
| Did not receive medical treatment/ hospitalization | 437 (99.3%)         |
| Received medical treatment or hospitalized for COVID-19 | 3 (0.7%)          |
| Family symptoms/tests                          |                          |
| No symptoms or positive test                   | 342 (82.2%)              |
| COVID-19 symptoms or tested positive           | 74 (17.8%)               |
| Reproductive health                            |                          |
| Length trying to conceive                      |                          |
| 1–6 mo                                         | 261 (59.3%)              |
| 6–12 mo                                        | 108 (24.6%)              |
| 1 y                                            | 71 (16.1%)               |

**ISEL = Interpersonal Support Evaluation List.**

Naya. COVID pandemic and fertility preference. Fertil Steril 2021.
during the pandemic (12.7%); 12 participants reported having to stop their ART because of the pandemic.

Approximately 1 in 3 (29.6%) participants reported changing their fertility preferences because of the COVID-19 pandemic. Of those that reported changing their fertility preferences, 23.9% reported TTC earlier than previously intended, 61.6% reported TTC later than previously intended, 3.9% reported trying an alternative plan (e.g., stopped ART and now trying to conceive naturally), and 0.8% reported permanently choosing to stop TTC.

**Aim 1: Differences in Demographic Characteristics, Financial Status/Access to Health Care, COVID-19-Related Experiences, and Physical, Reproductive, and Mental Health Among Those Who Changed Their Fertility Preferences Because of the Pandemic**

We compared demographic characteristics, financial status/access to health care, COVID-19-related experiences, and physical, reproductive, and mental health according to whether the participants reported changing or not changing their fertility preferences because of the pandemic. Results of these bivariate analyses can be found in Supplemental Tables 1–3 (available online). We found that the participants who reported changing their fertility preferences were on average older ($t = -2.45, P = .01$) and more likely to be cohabiting or single, divorced, or separated ($\chi^2 = 7.57, P = .02$). We also found nonheterosexual women, compared with heterosexual women ($\chi^2 = 6.51, P = .01$), and black or African American women, compared with white or Asian/Native Hawaiian/Pacific Islander women ($\chi^2 = 11.0, P = .01$) were more likely to change their fertility preferences. Those without health insurance also were more likely to change their fertility preference compared with those with health insurance ($P = .03$). The participants who perceived their health status to be good or fairly good were more likely to change their TTC plan than those who perceived their health to be average or poor ($\chi^2 = 11.68, P = .01$). Women whose family had been quarantined were less likely to change their fertility

### TABLE 2

| Table 2: Stepwise logistic regression model predicting change in fertility preferences in 440 participants. |
|---|---|---|---|---|
| **Dependent variable:** | **Model 1** | **Model 2** | **Model 3** | **Model 4** |
| Fertility preferences have changed due to the pandemic (1) | Fertility preferences have not changed due to the pandemic (ref:0) |
| Variables | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |
| Demographics | | | | |
| Age | 1.05 (0.98, 1.12) | 1.05 (0.99, 1.12) | 1.04 (0.97, 1.12) | 1.05 (0.98, 1.13) |
| Race (ref: White) | | | | |
| Black or African American | 3.51 (1.23, 10.03) | 3.59 (1.25, 10.26) | 4.76 (1.40, 16.19) | 5.45 (1.50, 19.90) |
| Asian, Native Hawaiian, or Pacific Islander | 1.08 (0.52, 2.22) | 1.10 (0.53, 2.27) | 1.21 (0.56, 2.62) | 1.27 (0.57, 2.82) |
| American Indian, Alaska Native, or Other | 1.85 (0.61, 5.59) | 2.18 (0.70, 6.78) | 2.73 (0.82, 9.07) | 2.88 (0.86, 9.69) |
| Sexual Orientation (ref: Heterosexual) | | | | |
| Not heterosexual | 1.63 (0.92, 2.9) | 1.59 (0.89, 2.85) | 2.32 (1.22, 4.40) | 2.76 (1.41, 5.42) |
| Marital status (ref: Married/domestic relationship) | | | | |
| Cohabiting, but not married | 2.00 (0.81, 4.97) | 1.74 (0.68, 4.44) | 1.31 (0.47, 3.59) | 1.41 (0.50, 3.98) |
| Single, divorced, separated | 0.88 (0.22, 3.51) | 0.90 (0.23, 3.62) | 0.83 (0.19, 3.67) | 0.91 (0.19, 4.40) |
| Financial status/access to health care resources | | | | |
| Annual household income | | | | |
| < $60,000 | 0.83 (0.38, 1.85) | 0.84 (0.37, 1.9) | 0.92 (0.38, 2.26) | 0.8 (0.32, 2.01) |
| $60,000–$99,999 | 0.89 (0.50, 1.56) | 0.84 (0.47, 1.49) | 0.90 (0.49, 1.68) | 0.87 (0.46, 1.65) |
| $100,000–$149,999 | 0.81 (0.47, 1.38) | 0.78 (0.46, 1.34) | 0.86 (0.48, 1.54) | 0.90 (0.50, 1.63) |
| Health insurance (ref: Currently insured) | | | | |
| Not currently insured | 6.00 (1.09, 33.05) | 5.96 (0.58, 61.18) | 10.26 (0.91, 115.28) | |
| Physical health | | | | |
| Perceived health status (ref: Good) | | | | |
| Fairly good | 0.91 (0.54, 1.56) | 0.88 (0.51, 1.52) | | |
| Average | 0.63 (0.32, 1.25) | 0.69 (0.35, 1.39) | | |
| Fairly poor | | | | |
| COVID-19-related experiences | | | | |
| Family isolation/quarantined (ref: Not isolated or quarantined) | | | | |
| Isolated or quarantined | 0.59 (0.33, 1.06) | 0.54 (0.30, 0.98) | | |
| Reproductive health | | | | |
| Length trying to conceive (ref: 1–6 mo) | | | | |
| 6–12 mo | | | | |
| >1 y | 0.28 (0.14, 0.55) | 0.67 (0.34, 1.3) | | |
| CI = confidence interval. | | | | |
| *P < .05. Naya. COVID pandemic and fertility preference. Fertil Steril 2021. | | | | |
preferences than those whose family had not been quarantined ($\chi^2 = 4.21, P=.04$). Lastly, those who had been trying for 1–6 months were more likely to change their fertility preferences than those who had been trying for 6–12 months ($\chi^2 = 20.94, P<.01$).

On the basis of these results, demographic variables identified in the literature (race, sexual orientation, and income) and/or associated with change in fertility preferences (age or marital status) were added first (model 1), then current health insurance status (model 2), perceived health status and family isolation/quarantine status (model 3), and lastly length of TTC (final model, model 4).

Results from the stepwise logistic regression model can be found in Table 2. In the final model, we found that the odds of changing fertility preferences in nonheterosexual women were 2.76 (95% confidence interval [CI], 1.41–5.42) times that of heterosexual women. Furthermore, across all the models, we consistently found that the odds of changing fertility preferences because of the COVID-19 pandemic in black or African American women were 5.45 (95% CI, 1.50–19.90) times that of white women.

**Aim 2: Differences in Demographic Characteristics, Financial Status/Access to Health Care, COVID-19–Related Experiences, and Physical, Reproductive, and Mental Health Among Those Who Chose to Try for a Child Later and Those Who Chose to Try for a Child Sooner Because of the COVID-19 Pandemic**

Among the subset of participants who reported changing their fertility preferences, we also examined differences in participant characteristics by whether participants sped up or pushed back their TTC plan because of the COVID-19 pandemic. Results of these bivariate analyses can be found in Supplemental Tables 4–6 (available online). The participants who pushed back their TTC plan were older compared with those who sped up their plan ($t = −3.31, P=0.03$). In addition, the participants who pushed back their TTC plan reported significantly worse mental health such as higher state anxiety ($t = −2.21, P=.03$), depressive symptoms ($t = −3.37, P<.01$), and lower social support ($t = 2.07, P=.04$) compared with those who sped up their TTC plan. Perceived stress was not associated with pushing back TTC plans ($t = −1.63, P=.11$). Lastly, women who had been TTC for 6–12 months or >1 year were more likely to push back their TTC plan than those who had been trying for <6 months ($\chi^2 = 10.64, P<.01$).

On the basis of these results, demographic variables that were identified in the literature (race, sexual orientation, and income) and/or associated with change in timing (age or number of children) were added first (model 1). We did not include household size because of collinearity issues with the number of children. Then, we added the length of TTC (model 2). In the final models (models 3a, 3b, and 3c), we included each state anxiety, depressive symptoms, and social support separately as a predictor, to address multicollinearity issues.

Results from the stepwise logistic regression model can be found in Table 3. Model 3a showed that every 1 unit increase in the state anxiety was associated with 26% (95% CI, 3%–54%) increase in the odds of pushing back TTC. Model 3b showed that every 1 unit increase in depressive symptoms was associated with 17% (95% CI, 5%–31%) increase in the odds of pushing back TTC.

**DISCUSSION**

This study examined the COVID-19 pandemic’s impact on fertility preferences of people who were TTC in the past year or currently TTC. Overall, approximately 1 in 3 participants reported a change in fertility preference because of the pandemic, among which the majority reported that they were now TTC later than previously intended. This finding is consistent with other recent studies reporting that approximately a third of their respondents had altered their fertility preference, mostly abandoning or pushing back TTC (8, 9).

In our study, black or African American women reported higher odds of changing fertility preferences compared with white women. Given the small sample of black or African American women in our study, these findings must be interpreted with caution. However, these findings are in line with another recent study conducted in the United States that found that black and Hispanic women, in comparison to white women, were more likely to report wanting to have children later or wanting fewer children because of the pandemic (6). This may be because of the fact that black and African American communities experienced disproportionately high COVID-19 infection and death rates in the United States (40). It also must be acknowledged that the cultural, social, and political climate of the time of data collection may also have influenced the black and African American participants’ fertility preferences.

Our study also found that queer women, compared with heterosexual women, reported higher odds of changing fertility preferences. These results also are supported by another similar study and may be because of the various ways the reproductive health of sexual minorities was affected by the pandemic (6). For example, the “TTC process” for queer women often requires involved interactions with multiple parties and institutions (e.g., donors and cryobanks) (41), during which many report experiencing heterosexist comments and a general lack of support for their “TTC process” (42, 43). These experiences of discrimination make queer-friendly reproductive health providers important (42), but they may have been less accessible during the early stages of the pandemic because of reduced appointment times and closures of some doctor offices and fertility clinics. Therefore, in the face of the COVID-19 pandemic, queer people already experiencing sociocultural barriers to receiving adequate reproductive care may have been motivated or forced to change their fertility preference.

Among those who reported changing fertility preferences, we found that the participants with higher anxiety and depressive symptoms reported higher odds of pushing back TTC instead of TTC earlier. Because of the cross-sectional nature of this analysis, we were unable to elucidate whether people with increased anxiety and depressive symptoms due to the pandemic were more likely to push back TTC, or whether
having to push back TTC due to the pandemic led to increased symptoms. Although there is evidence of increased prevalence of mental health issues among those receiving fertility treatment (44, 45), there are very few studies examining these outcomes among the broader population of people TTC (42), and no literature has explored how changes in fertility preferences may affect mental health. Nevertheless, the reciprocal relationship between reproductive and mental health is well documented (46). The pandemic has significantly increased the prevalence of symptoms of anxiety, depression, and stress in the general population (36) and may have especially exacerbated these symptoms among those TTC because of sudden alterations in plans around fertility preferences. This may especially be true for those receiving fertility treatments as in the early stages of the pandemic (March 2020), the American Society for Reproductive Medicine recommended the suspension of initiation of new treatment cycles and minimization of in-person interactions (7). It should be noted that we conducted post hoc analyses exploring interactions of demographic and mental health variables, but the results were not significant. Our findings support the need to better understand how the pandemic may be influencing mental health outcomes and fertility preferences.

Although our study provides preliminary findings on the COVID-19 pandemic’s influence on fertility preferences of those TTC, the study is not without limitations. First, although our study asked whether the pandemic affected the participants’ fertility preferences and if so, whether the participants wanted to try to conceive later or earlier because of the pandemic, we did not explicitly ask why the participants were motivated to change their fertility preferences. Future studies examining specific reasons behind changes in fertility preferences could help identify possible social and political issues (e.g., unemployment and access to reproductive care) that are leading to these disparities. In addition, since the participants were recruited via convenience sampling of the “TTC community,” the pool of potential participants was more likely to be currently actively TTC. Therefore, our study underrepresents people who stopped TTC before the study initiation or those who are not a part of these online forums. Furthermore, our study population is majority white, well educated, high-income, insured, and employed full-time.

### Table 3

Stepwise logistic regression model predicting how fertility preferences changed in 104 participants.

| Variables | Model 1 | Model 2 | Model 3a | Model 3b | Model 3c |
|-----------|---------|---------|----------|----------|----------|
|           | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |
| Demographics |         |         |          |          |          |
| Age | 1.13 (0.98, 1.31) | 1.11 (0.95, 1.28) | 1.10 (0.94, 1.28) | 1.08 (0.92, 1.26) | 1.10 (0.94, 1.29) |
| Race (ref: White) |         |         |          |          |          |
| Black or African American | 0.65 (0.12, 3.52) | 0.77 (0.11, 5.44) | 0.51 (0.06, 4.46) | 0.62 (0.07, 5.77) | 0.59 (0.07, 4.95) |
| Asian, Native Hawaiian, or Pacific Islander | 4.14 (0.44, 38.59) | 3.5 (0.31, 38.91) | 1.98 (0.17, 23.23) | 1.33 (0.10, 18.06) | 3.3 (0.29, 37.02) |
| American Indian, Alaska Native, or Other | 2.41 (0.21, 28.27) | 2.93 (0.23, 36.92) | 2.06 (0.16, 26.38) | 2.65 (0.20, 35.71) | 3.78 (0.28, 50.94) |
| Sexual orientation (ref: Heterosexual) |         |         |          |          |          |
| Not heterosexual | 5.1 (1.03, 25.31) | 5.25 (1.02, 27.12) | 3.46 (0.65, 18.58) | 2.86 (0.53, 15.28) | 3.7 (0.73, 18.83) |
| No. of children (ref: No child) |         |         |          |          |          |
| 1 | 4.13 (0.81, 21.03) | 5.45 (1.04, 28.48) | 9.77 (1.00, 95.83) | 10.45 (1.07, 102.33) | 7.81 (0.84, 73.01) |
| ≥2 | 1.65 (0.13, 20.84) | 2.1 (0.15, 28.64) | 1.25 (0.09, 18.37) | 1.13 (0.07, 18.51) | 2.05 (0.14, 30.11) |
| Financial status/access to health care resources |         |         |          |          |          |
| Annual household income < $60,000 | 0.46 (0.09, 2.36) | 0.54 (0.10, 2.83) | 1.00 (0.17, 5.97) | 1.07 (0.17, 6.69) | 0.66 (0.11, 4.01) |
| $60,000–$99,999 | 0.99 (0.27, 3.58) | 0.69 (0.16, 2.96) | 0.88 (0.18, 4.21) | 1.01 (0.21, 4.9) | 0.85 (0.19, 3.88) |
| $100,000–$149,999 | 1.01 (0.30, 3.39) | 1.00 (0.27, 3.67) | 0.63 (0.14, 2.87) | 1.02 (0.23, 4.45) | 0.74 (0.18, 3.12) |
| Reproductive health |         |         |          |          |          |
| Length TTC (ref: 1–6 mo) |         |         |          |          |          |
| 6–12 mo | 10.65 (1.23, 92.39) | 9.39 (0.97, 91.03) | 8.29 (0.89, 77.52) | 7.82 (0.82, 74.2) |          |
| >1 y | NA | NA | NA | NA |          |
| Mental health |         |         |          |          |          |
| Trait anxiety (STAI-6) | 1.26 (1.02, 1.57) |          |          |          |          |
| Depressive symptoms (CESD-10) |          |          |          |          |          |
| Social support (ISEL) |          |          |          |          | 0.95 (0.84, 1.06) |

CESD = Center for Epidemiologic Studies Depression; CI = confidence interval; ISEL = Interpersonal Support Evaluation List; NA = not applicable; OR = odds ratio; STAI = Spielberger State-Trait Anxiety Inventory; TTC = trying to conceive.

*P < .05.
CONCLUSION

Results from the current study, although preliminary, suggest that the COVID-19 pandemic may be deepening the disparities in reproductive health and family planning. Future research is needed to examine how COVID-19 is amplifying the existing reproductive health inequalities by disproportionately impacting socially disadvantaged groups.

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Efectos tempranos de la pandemia de COVID-19 pandemia en las preferencias de fertilidad en Estados Unidos: un estudio exploratorio.

**Objetivo:** Explorar los primeros impactos dispares de la pandemia de COVID-19 en las preferencias de fertilidad.

** Diseño:** Estudio transversal.

**Entorno:** Cuestionario de encuesta en línea.

** Pacientes:** Un total de 440 participantes femeninas que estaban intentando concebir (TTC) en el último año o que actualmente están TTC.

**Intervención(es):** No se administraron intervenciones.

**Medida(s) de resultado principal(es):** Cambio en la preferencia de fertilidad.

** Resultado(s):** Aproximadamente 1 de cada 3 participantes informó haber cambiado sus preferencias de fertilidad debido a la pandemia de COVID-19. De los que informaron de un cambio en sus preferencias de fertilidad, el 23.9% informaron que habían iniciado el embarazo antes y el 61.6% informaron que habían iniciado el embarazo más tarde. Los resultados preliminares muestran que las probabilidades de cambiar las preferencias de fertilidad en las mujeres negras o afroamericanas eran 5,45 (intervalo de confianza [IC] del 95%, 1,50-19,90) veces la de las mujeres blancas y en las mujeres no heterosexuales era de 2,76 [IC 95%, 1,41-5,42] veces la de las mujeres heterosexuales. Además, cada aumento de 1 unidad en los estados de ansiedad y síntomas depresivos, se asoció con un 26% [IC del 95%, 3%-54%] o un 17% [IC 95%, 5%-31%] en las probabilidades de retrasar el TTC, respectivamente.

**Conclusiones:** Este estudio exploratorio destaca cómo las preferencias de fertilidad de las minorías raciales y étnicas, las minorías sexuales y las personas con problemas de salud mental pueden verse influídas de forma dispar por la pandemia. Es necesario investigar más a fondo el efecto dispar de la pandemia de COVID-19 en las preferencias de fertilidad.