Learning from maternal voices on COVID-19 vaccine uptake: Perspectives from pregnant women living in the Midwest on the COVID-19 pandemic and vaccine

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Abstract
The aim of this study was to understand COVID-19 vaccine perceptions and decision-making among a racially/ethnically diverse population of pregnant and lactating women in the Midwest. Pregnant female participants (N = 27) at least 18 years or older living in the Midwest were recruited to participate in a maternal voices survey. A mix-methods approach was used to capture the perceptions of maternal voices concerning the COVID-19 vaccine. Participants completed an online survey on COVID-19 disease burden, vaccine knowledge, and readiness for uptake. A total of 27 participants completed the Birth Equity Network Maternal Voices survey. Most participants were African American (64%). Sixty-three percent intend to get the vaccine. Only 25% felt at-risk for contracting COVID-19, and 74% plan to consult their provider about getting the COVID-19 vaccine. At least 66% had some concerns about the safety of the vaccine. Participants indicated a willingness to receive the COVID-19 vaccine, especially if recommended by their provider. We found little racial/ethnic differences in perceptions of COVID-19 and low vaccine hesitancy.

Keywords
COVID-19, health disparities, pregnancy, racial/ethnic minorities
INTRODUCTION

The COVID-19 pandemic has greatly impacted the health and well-being of communities nationally and globally. Pregnant women and their infants are no exception. From January 2020 to June 2021 over 98,000 pregnant women in the United States tested positive for COVID-19, resulting in over 16,000 hospitalizations and at least 109 deaths (Centers for Disease Control and Prevention [CDC], 2021a). With mitigation efforts in place, COVID-19 vaccines have shown promising results in helping to lessen the impact of severe COVID-19 infection and or death (Thompson et al., 2021). COVID-19 vaccines are particularly important for high-risk populations such as pregnant women, but perhaps even more so for groups of pregnant women with already high maternal and infant mortality rates.

1.1 Health disparities, Race, and COVID-19

Racial and ethnic minority populations are disproportionately affected by COVID-19 through severe disease, mortality, and death (Abedi et al., 2020; Webb Hooper et al., 2020). Racial and ethnic minority pregnant women are also disproportionately affected by COVID-19 (CDC, 2021b; Onwuzurike et al., 2020). Onwuzurike et al. (2020) found significant disparities in a small northeast United States population of pregnant women. The most severe cases of COVID-19 were among Non-Hispanic Black patients (34%) and Hispanic patients (30%). They also found of those with the most severe disease, 67% had at least one other chronic disease condition (i.e., lung disease, hypertension, diabetes, obesity), which likely increased COVID-19 complications. Grechukhina et al. (2020) observed over 1500 pregnant women and found women of Hispanic ethnicity to have the most severe COVID-19 disease. While most focus is on the health-related risk of COVID-19 and pregnancy, there are also social, financial, and mental health concerns. For a Hispanic pregnant population in the Northeast United States, housing insecurity was an added concern during COVID-19 (Onwuzurike et al., 2020). African American women not only suffer disproportionately from health disparities related to COVID-19, but mental health-related issues as well. Gur et al. (2020) found pregnant African American women have higher rates of anxiety related to the current COVID-19 pandemic compared to other groups of pregnant women. African American women were also more likely to suffer from COVID-19 related job loss and stress (Gur et al., 2020). Perzow et al. (2021) found pregnant women across all races/ethnicities doubled in depressive symptoms, from 15.5% reported depressive symptoms-pre-pandemic, to 35% reported depressive symptoms during the COVID-19 pandemic. Mental health and emotional well-being have likely added to anxiety that can exacerbate pre and postnatal health problems (Perzow et al., 2021).

1.2 Pregnancy and COVID-19

Women are at a higher risk of COVID-19 infection during pregnancy. According to the CDC, Society of Maternal and Fetal Medicine (SMFM), and American College of Obstetrics and Gynecologist (ACOG), pregnant women are more likely to suffer from severe illness if infected with COVID-19 (ACOG, 2020; CDC, 2021b; SMFM, 2021). During pregnancy, women are more likely to suffer from respiratory infections, may need a ventilator more often if infected with COVID-19 or experience pre-term birth, pre-eclampsia, or even death (Wei et al., 2021). Stafford et al. (2021) report pregnant women with a COVID-19 infection and a chronic disease condition like diabetes or hypertension have worse outcomes resulting from a COVID-19 infection. In a recent study conducted in the Northeastern United States, pregnant women with positive COVID-19 disease reported higher rates of hypertensive disorders of pregnancy (HDP), HELLP (Gestational hypertension, pre-eclampsia, eclampsia and hemolysis, elevated liver disease, and low platelet), and pre-existing hypertension (Grechukhina et al., 2020). COVID-19 can lead to pregnancy complications and is often encompassed with severe pneumonia.
Pregnant women with pneumonia have a higher risk of delivering a low-birth-weight baby or preterm infant (Chen et al., 2012). Common risk factors for poor birth outcomes are often linked to low birth weight and preterm birth (Manuck, 2017). The health complications from COVID-19 during pregnancy and effect on mother’s health are particularly concerning for certain racial and ethnic minority groups, such as African American women and Hispanic women where significant disparities already persist in maternal morbidity and mortality, infant mortality rates, and birth outcomes (Howell et al., 2018; Liese et al., 2019; Office of Minority Health [OMH], 2017). Given the severe health risk from COVID-19 particularly for racial and ethnic minority pregnant women, the COVID-19 vaccine is needed (OMH, 2017).

Recently, the ACOG provided guidance for pregnant and lactating individuals to receive the vaccine (ACOG, 2020). As of June 21, 2021, over 126,000 pregnant women (including those in the periconception period—within 30 days of last menstrual period) reported their vaccination status to the v-safe COVID-19 registry through a phone app to the Centers for Disease Control and Prevention (CDC, 2021b). The COVID-19 vaccine is now widely available in the United States but not always acceptable (as of this writing 37% of the United States population remains unvaccinated (Sparks et al., 2021), understanding vaccine decision making and uptake is vital for at-risk populations (Kilich et al., 2020). The current vaccine literature finds recommendations are the best way to increase uptake of vaccines during pregnancy (Ahluwalia et al., 2010; Arnold et al., 2019; Moniz et al., 2013). Therefore, it is important from a community perspective to determine how likely racial/ethnic minority pregnant women are willing to receive the vaccine and what hesitancy may exist to prevent further disparities for this population.

## METHODS

### 2.1 Participants and procedures

The Kansas Birth Equity Network (KBEN) was formed over the past two years based on work with community stakeholders who are interested in improving maternal and child health outcomes that persist for racial/ethnic minority populations. These stakeholders include patients (i.e., mothers, fathers, and caregivers), community members, professionals in maternal and child health organizations, faith-based organizations, the education, and community sector. We engaged this community of stakeholders to recruit participants for the KBEN Maternal Voices Survey. Few studies are currently looking specially at racial/ethnic differences in perceptions of COVID-19 vaccine perceptions and beliefs among a pregnant population. Our study helps fill a gap in the literature from a community-engagement perspective about this important topic. This study was approved by the author’s University Human Subjects Committee.

Our population included 27 female participants at least 18 years or older living in the Midwestern United States. To be eligible for this study, participants had to be at least 18 years of age, expecting or postpartum. Participants were recruited for a virtual study to capture maternal voices on prenatal care access, perception of COVID-19 disease burden and vaccine. Survey responses were captured before the COVID-19 vaccines were available to the public. Participants were initially recruited from two virtual community-based webinars series on Maternal health and birth outcomes sponsored by the Kansas Birth Equity Network (website: https://www.kumc.edu/school-of-medicine/population-health/kansas-birth-equity-network.html). Participants were invited to complete the KBEN Maternal Voices Survey through a link provided through REDCap. We also used a snowball sampling technique by asking webinar participants and those enrolled in the study to share the study sign-up link to other potentially eligible study participants.

Data were collected between June 2020 and August 2020 via REDCap. Once signing-up for the initial study via a REDCap link, completing the eligibility process, and the online consent process, participants received access to the survey. Participants completed a demographic survey, quantitative survey, and qualitative questions outlined below. Participants also received a $10 gift card for their time.
2.2 | Measures/Instruments

Study participants completed a 47-item online survey, which included general demographic questions on race, income, place of residence, Facebook information, and email. Other parts of the survey included a mix of quantitative and qualitative questions. Quantitative questions focused on prenatal care, birth, infant health, knowledge of COVID-19 vaccines during pregnancy, and strategies for learning about the COVID-19 vaccine. Participants were also asked how past historical studies that involved medical misuses such as Tuskegee Syphilis Study (Corbie-Smith, 1999; Gamble, 1997) and Henrietta Lacks (Wolinetz & Collins, 2020) influenced their vaccine decision (see Table 1). Participants were also asked if they have ever experienced racial discrimination during a medical visit. These questions were asked to better understand how this may influence their decision on receiving a vaccine or if it impacts their perception of trust when receiving advice from the health care field.

In addition, there were four open-ended qualitative questions which asked participants about COVID-19 experiences. The four questions asked participants to describe their knowledge about COVID-19, to describe their fears about getting COVID-19, to describe what medical professionals could do to increase the likelihood of their interest in getting the COVID-19 vaccine (see Table 2).

2.3 | Data analysis

This study used a mix-methods approach utilizing quantitative and qualitative design and data analysis. Standard descriptive statistics were used to create a demographic profile and measure survey responses. For quantitative, bivariate analysis was used to examine survey responses. We used descriptive statistics and Fisher’s Exact Test to examine survey responses by race. For qualitative data, we used thematic analysis to examine participants’ responses to survey questions. Two coders (Megha Ramaswamy and Paigton Mayes) conducted the coding. The study coders (Megha Ramaswamy and Paigton Mayes), conducting the initial open coding, met to discuss initial coding findings, then conducted a second round of coding to arrive at emerging themes, following by a final round of coding and a discussion to finalize the study’s emerging themes.

2.4 | Authors positionality statement

Before we present our findings, the authors would like to provide our positionality to help frame this study. The authorship of this study is multi-cultural and multi-generational. The following authors are of African American descent (Redmond, Smith). The following author is of African American and Indigenous descent (Mayes). While our other two co-authors are of Asian descent (Ramaswamy) and Non-Hispanic White descent (Ault). Authors Redmond, Smith, and Ramaswamy have an extensive academic background in women’s health research including

| TABLE 1 | Questions on historical medical experiments and discrimination: Kansas Birth Equity Network maternal voices survey |
|---|---|
| Survey questions |  
1. Describe what you currently know about the COVID-19 vaccine?  
2. Can you describe any fears of the COVID-19 vaccine?  
3. Can you describe what medical professionals could do to increase your willingness to take the COVID-19 vaccine?  
4. If you experienced racial discrimination during your pregnancy, can you describe how these experiences influenced your decision to receive the COVID-19 vaccine? |
maternal health and infant mortality and public health research. Author (Ault) is a physician with extensive applied and academic experience in women's health issues. Redmond, Smith, Ramaswamy, and Mayes also have a strong background in public health research which helps frame the lens on the focal point of the current paper's topic (COVID-19 and vaccinations in pregnancy). Author(s) Mayes and Redmond are by training community psychologists and were primarily responsible for coding. Our lived experiences and academic training contribute to the lens in which the data is presented. We understand the importance of the lens we use to present this data. We reflected in our coding and interpretation of the data how our personal experiences frame our lens as well as what this study means in the current state of our COVID-19 pandemic. Therefore, our effort was collaborative to ensure the work was sensitive and appropriate in the manner it was conducted.

3 | RESULTS

Results from this study captured data from twenty-seven individuals who participated in the COVID-19 KBEN Maternal Voices survey. Many of the participants were African American (66.7%), followed by 29.6% identifying as Non-Hispanic White or 3% self-identifying as Hispanic. A majority were in their first trimester of pregnancy (44%). Most of the participants had completed prenatal education classes (see Table 3).

3.1 | Perceptions and concerns about COVID-19 vaccine

Most participants indicated they had concern about the safety of the COVID-19 vaccine (67%). When looking at racial groups we found no significant differences. Participants also expressed a strong concern over the effectiveness of the COVID-19 vaccines but acknowledged having sufficient information (52%). In terms of social norms, most participants were not influenced by family, religious beliefs, or other social influences in their decision about the COVID-19 vaccine. There was also no general fear that getting the vaccine would give one COVID-19. Overall, most participants did not believe they or their unborn child were at-risk for contracting COVID-19 (74%), and they generally had little concerns about the vaccine (100%) (see Table 4).

3.1.1 | Influential strategies to increase likelihood of COVID-19 vaccine uptake

Participants were asked which strategies would most influence their decision to get vaccinated for COVID-19. The most influential strategy was a health care provider who would both recommend the vaccination and provide...
access to the vaccine in their clinic. While results by race and ethnicity were not significant, most Non-Hispanic White patients endorsed this statement. African American patients were split evenly on this question. The least effective strategies for this patient population were knowing their healthcare provider was vaccinated, receiving a patient-friendly pamphlet, attending a community forum, and receiving text message reminders about the vaccine (see Table 5).

### 3.1.2 Historical factors and influence on decision to get COVID-19 vaccine

Participants were asked about their general knowledge of historical events and the influence this may have on their decision to get vaccinated for COVID-19. A majority were not aware of the Tuskegee Syphilis Study.

| TABLE 3 Baseline Characteristics of Kansas Birth Equity Network maternal voices survey participants |
|-----------------------------------------------|-----|---|
| Demographic characteristic                  | N = 27 | % |
| Race/ethnicity African American              | 18  | 66.7 |
| Non-Hispanic White                           | 8   | 29.6 |
| Hispanic                                     | 1   | 3.7 |
| Prior pregnancies                            |     |    |
| Zero prior pregnancies                       | 1   | 3.7 |
| One prior pregnancy                          | 17  | 63  |
| At least 2 prior pregnancies                 | 9   | 33.3 |
| Weeks’ Gestation                             |     |    |
| First trimester (Week 1 to Week 12)          | 12  | 44.4 |
| Second trimester (Week 13 to Week 27)        | 9   | 33.3 |
| Third trimester (Week 28 until birth)        | 5   | 18.5 |
| Primary provider office for obstetric services |       |    |
| Medical practice (group, solo, or combination) | 23  | 85.1 |
| Maternity center                             | 9   | 33.3 |
| Independent certified nurse                  | 1   | 3.7 |
| Doula supported solo medical provider        | 0   | 0   |
| Prenatal education programs                  |     |    |
| Prenatal education program                   | 21  | 77.7 |
| Parenting classes                            | 7   | 25.9 |
| Breastfeeding education program              | 18  | 66.6 |
| Exercise program                             | 16  | 59.2 |
| Counseling                                   | 9   | 33.3 |
| Received influenza vaccine                    |     |    |
| Yes                                          | 8   | 29.6 |
| No                                           | 19  | 70.3 |
Only 5 (18%) were aware of the Tuskegee experiments (Corbie-Smith, 1999; Gamble, 1997). A similar finding was found regarding the Henrietta Lacks case from Johns Hopkins University (Nature, 2020; Skloot, 2011; Wolinetz & Collins, 2020). Nine of the participants (33%) were aware of the Henrietta Lacks story. Participants, regardless of race or ethnicity indicated a history of racial discrimination with the health care system was not an influential factor in their decision to get vaccinated nor did it raise concerns about the vaccination (see Table 6).

### 3.1.3 Qualitative findings on COVID-19 knowledge, concerns, and vaccine uptake

As part of the COVID-19 Maternal Voices survey, participants were asked to complete four qualitative questions on vaccine knowledge and concerns about COVID-19. After several rounds of coding, the following themes emerged: concern about vaccine safety, general anxiety from the pandemic, limited vaccine hesitancy, and seeking knowledge. Overall, the concerns expressed in the open-ended questions differ slightly from the quantitative survey responses (Table 7).

### TABLE 4 Concerns about COVID-19 Vaccine and disease burden by race/ethnicity: Kansas Birth Equity Network maternal voices 2020

| Concerns about COVID-19 vaccine                                                                 | African American | Non-Hispanic White | Hispanic | Total |
|-------------------------------------------------------------------------------------------------|------------------|--------------------|----------|-------|
|                                                                                                 | n                | n                  | n        | n     |
| Concern about vaccine safety and side effects for self and unborn baby                         | 11 61.1          | 6 33.3             | 1 5.6    | 18 66.7 |
| Unsure about vaccine effectiveness                                                             | 9 56.3           | 7 43.8             | 0 0      | 16 59.3 |
| Lack of knowledge about COVID-19 vaccine                                                       | 8 57.1           | 5 35.7             | 1 7.1    | 14 51.9 |
| Lack of provider recommendation to receive the COVID-19 vaccine                                 | 3 50             | 2 33.3             | 1 16.7   | 6 22.2 |
| Lack of knowledge of burden of disease due to COVID-19                                         | 3 60             | 1 20               | 1 20     | 5 18.5 |
| Lack of trust in the COVID-19 vaccine                                                          | 6 66.7           | 3 33.3             | 0 0      | 9 33.3 |
| Do not feel they or their unborn child are at-risk for COVID-19                                 | 6 85.7           | 1 14.3             | 0 0      | 7 25.9 |
| Social norms and family influence                                                              | 1 50             | 1 50               | 0 0      | 2 7.4 |
| Religious beliefs about Vaccines                                                               | 1 100            | 0 0                | 0 0      | 0 0   |
| Previous reaction to other vaccines                                                            | 3 60             | 2 40               | 0 0      | 5 18.5 |
| Fear the vaccine may give you COVID-19                                                         | 1 50             | 1 50               | 0 0      | 2 7.4 |
| Do not have any concerns about the COVID-19 vaccine                                            | 0 0              | 0 0                | 0 0      | 0 0   |

Note: Number of respondents who indicated this statement was true for them African American (n = 18), Non-Hispanic White (n = 8), and Hispanic (n = 1). Percentage = % of respondents who indicated this statement was true for them. The denominator for column b is the total N for each column. The total N represents the total number of respondents regardless of race/ethnicity who indicated this response was true for them.
3.1.4 Limited vaccine hesitancy

Participants expressed limited hesitancy about getting the COVID-19 vaccine. A few participants indicated they had concerns in general about vaccines. An African American female in Wichita, KS, stated, “Vaccines can cause pain or complications in children.” One participant indicated they were not physically fit for vaccination, while another was uncertain about how well the vaccine would work. A White female participant, from Southeast Kansas stated, “I don’t know if the vaccine will work. The virus is too scary.” While some just simply stated they were not interested, “I don’t want to get vaccinated. I think I’d be better off not getting vaccinated” (African American female, Andover, KS). In many instances, the hesitancy over the vaccine was expressed as a safety concern.

3.1.5 General vaccine safety concerns

Even though there was limited hesitancy, many mothers expressed concern about vaccine safety. Several participants were concerned about side effects or the health of their unborn child if they received the vaccine. A White female participant from Maize, KS stated, “I’m worried that the vaccination will affect my child’s health.” While an African American female from Northeast KS stated, “… I am afraid of the side effects of the vaccine on me and my baby, so I must choose carefully.” Other safety concerns were just trying to understand the effect on one’s overall health. A female participant from Sedgwick KS said, “I am concerned about the possible side effects of the vaccine. I have heard of people dying after being vaccinated.” Even though participants had safety concerns, they also sought out knowledge to help alleviate these concerns.

### Table 5 Strategies that would Increase Participant’s decision to get their COVID-19 vaccine: Kansas Birth Equity Network maternal voices 2020

| How likely would the following strategy increase your decision to get the COVID-19 vaccine? | African American | Non-Hispanic White | Hispanic | Total |
|---|---|---|---|---|
| | n | % | n | % | n | % | n | % |
| Specific safety information about the vaccine in pregnant women | 6 | 33.3 | 5 | 62.8 | 1 | 100.0 | 12 | 44.4 |
| Vaccine recommendation and offered by Health Care Provider | 4 | 22.2 | 2 | 25.0 | 0 | 0.0 | 6 | 22.2 |
| Utilization of the same healthcare providers who both recommend & provide the vaccine | 9 | 50.0 | 6 | 33.3 | 0 | 0.0 | 15 | 55.5 |
| Knowledge of the vaccine safety | 7 | 38.8 | 2 | 25.0 | 1 | 100.0 | 10 | 37.0 |
| Knowledge of vaccine safety and pregnancy | 6 | 33.3 | 3 | 37.5 | 1 | 100.0 | 10 | 37.0 |
| Physician and or nurse previously vaccinated | 7 | 38.8 | 4 | 50.0 | 0 | 0 | 11 | 40.7 |
| Patient friendly pamphlet | 0 | 0 | 2 | 25.0 | 0 | 0 | 2 | 7.4 |
| Community forum discussing the vaccine and pregnancy | 2 | 11.1 | 2 | 25.0 | 0 | 0 | 4 | 14.8 |
| Text reminders | 0 | 0 | 1 | 12.5 | 0 | 0 | 1 | 3.7 |
| Social Media Campaign | 1 | 5.5 | 1 | 12.5 | 0 | 0 | 2 | 7.4 |

Note: Number of respondents who indicated this statement was true for them African American (n=18), Non-Hispanic White (n=8), and Hispanic (n=1). Percentage = % of respondents who indicated this statement was true for them. The denominator for columns b is total N for each column. The total N represents the total number of respondents regardless of race/ethnicity who indicated this response was true for them.
3.1.6 | Seeking greater knowledge

Participants were also seeking more information on the COVID-19 vaccine. Many indicating they would get the vaccine after learning more about it. For instance, an African American female living in Lawrence, KS indicated she wanted to know more about the vaccine, "I am trying to learn more information about the vaccine... I am very worried about myself, and my baby being infected with the virus, and I am afraid of the side effects of the vaccine on me and my baby." This same participant stated after learning more about the vaccine's safety, "... if it's safe enough, I'll get it as soon as possible." Concern about vaccine safety and health risk was also linked to overall anxiety.

### TABLE 6  Influence of historical factors on decision to get COVID-19 vaccine by race/ethnicity: Kansas Birth Equity Network maternal voices survey

| Historical factors | African American | Non-Hispanic White | Hispanic | p |
|--------------------|------------------|--------------------|----------|---|
|                    | n    | %       | n   | %       | n | %   |    |
| Knowledge of Tuskegee Syphilis Study |       |         |     |         |   |      |    |
| Yes                | 3    | 11.1    | 2   | 7.4      | 0 | 0   | p = 0.69 |
| No                 | 15   | 55.6    | 6   | 22.2     | 1 | 3.7 |
| Knowledge of Henrietta Lacks Story |       |         |     |         |   |      |    |
| Yes                | 6    | 22.2    | 3   | 11.1     | 0 | 0   | p = 1.0 |
| No                 | 12   | 44.4    | 5   | 18.5     | 1 | 3.7 |
| Experienced Racial Discrimination w/Health Care System |       |         |     |         |   |      |    |
| Yes                | 3    | 11.1    | 1   | 3.7      | 1 | 3.7 | p = 0.20 |
| No                 | 15   | 55.6    | 7   | 25.9     | 0 | 0   |
| History of Racism |       |         |     |         |   |      |    |
| Yes                | 2    | 7.4     | 2   | 7.4      | 0 | 0   | p = 0.62 |
| No                 | 16   | 59.3    | 6   | 22.2     | 1 | 3.7 |
| Distrust of Healthcare Providers |       |         |     |         |   |      |    |
| Yes                | 7    | 25.9    | 0   | 0        | 0 | 0   | p = 0.08 |
| No                 | 11   | 40.7    | 8   | 29.6     | 1 | 3.7 |
| Federal Government Involvement |       |         |     |         |   |      |    |
| Yes                | 1    | 3.7     | 2   | 7.4      | 0 | 0   | p = 0.30 |
| No                 | 17   | 63      | 6   | 22.2     | 1 | 3.7 |
| Media              |       |         |     |         |   |      |    |
| Yes                | 1    | 3.7     | 4   | 14.8     | 0 | 0   | p = 0.03* |
| No                 | 17   | 63      | 4   | 14.8     | 1 | 3.7 |

Note: Number of respondents who indicated this statement was true for them African American (n = 18), Non-Hispanic White (n = 8), and Hispanic (n = 1), total of (n = 27) participants. Percentage = % of respondents who indicated this statement was true for them. The denominator for columns b is total N for each column. The total N represents the total number of respondents regardless of race/ethnicity who indicated this response was true for them.
3.1.7 | Ongoing anxiety and worry about health and infection

Many participants indicated they were living with anxiety since the pandemic started. This anxiety was also linked to a lack of knowledge about the vaccine and COVID-19 pandemic itself, as one White female participant from Northeastern KS stated, "I don't know much about it but I'm in a bad way. So, take the necessary steps to comfort yourself when necessary." There was also anxiety and concern over their general health. As one African American female participant from Lawrence, KS stated, "Faced with such a serious epidemic, I am very worried about myself, and my baby being infected with the virus." There was just overall worry about getting COVID-19, An African American female participant from Wichita, KS indicated, "I'm a little scared of what's going on. I'm worried that I might get COVID-19, which might have an effect on the baby that's coming." Being connected to a primary care provider seemed to help with some of the concerns over the vaccine and possible infection.

3.1.8 | Assurance from health care provider

Several participants indicated having an assurance on vaccine safety or receiving more information from their doctor would help with their concerns. For example, a White female participant from Wichita, KS stated, "If the doctor could introduce me more knowledge about vaccine safety, I would be more willing to accept it." This finding is like what we found in the survey results where participants also indicated provider recommendation would be significantly important for their vaccine uptake. Assurance also came in the form of providers personally being vaccinated. A White female participant from Southwestern, KS felt if their health care provider got vaccinated this would give them some assurance about receiving the vaccine, "If the doctor has used the vaccine himself, I think I would be more willing to accept it." However, in general, participants just wanted assurances on safety and examples of others who got vaccinated and were okay. This was expressed by a White female participant from Butler County, KS, "If there are safety examples of vaccination before, I will trust more."

4 | DISCUSSION

This study sought to explore the perceptions of the COVID-19 vaccine and health risk among a diverse group of maternal voices during the COVID-19 pandemic. We found participants had mixed reactions about COVID-19 vaccine and risk of disease. We did not find significant differences among racial/ethnic groups in our sample. Most
felt they were not at-risk for contracting COVID-19. There were a few participants who did express anxiety or concern about health risk from COVID-19. Participants appeared to embrace the importance of receiving the vaccine and were seeking knowledge to learn more about their options.

We found little vaccine hesitancy within this population of participants. There was general concern about vaccine safety and effectiveness, but a consensus that the vaccine was trusted. We anticipated the African American participants in our study would report more hesitancy in receiving the vaccine. This was not present in our data. This contrasts with what was expected based on the literature regarding vaccine hesitancy among pregnant African Americans (Moniz et al., 2013). Our findings on low vaccine hesitancy among a pregnant population is similar to a recent study published on COVID-19 vaccine and pregnancy (Levy et al., 2021). Levy et al. (2021) surveyed over 600 pregnant women about receiving the COVID-19 vaccine and found the majority (58%) were willing to receive the vaccine once available. In our study, we found women were willing to receive the vaccine or consider getting their shot if their health care provider recommended, they do so.

While there is limited data on the COVID-19 vaccine uptake during pregnancy, our results favor other vaccine literature during pregnancy when it comes to provider recommendation (Kriss et al., 2017). With Tdap and influenza there is a low prevalence of vaccine uptake among pregnant women in general (Ahluwalia et al., 2010; Arnold et al., 2019; Moniz et al., 2013). This prevalence is further exacerbated along racial lines. There are noted racial disparities that influence vaccine uptake among African American women and Asian populations (Ahluwalia et al., 2010; Arnold et al., 2019; Moniz et al., 2013). Both groups were found to have lower vaccine uptake, mainly due to lack of provider recommendation. In our study, we found participants were more interested in the COVID-19 vaccine if they received a recommendation from their provider or assurance about the vaccine. How this will translate into actual uptake is still unclear. However, it is an important area to consider intervening upon to ensure recommendations are being made and patients are receiving them in equal measure. Further work on provider recommendation and patient initiation of this advice for COVID-19 vaccine uptake need to be completed.

Our study found no statistical difference between race and ethnicity for concerns over getting the COVID-19 vaccination. Our study population was relatively small; however, all groups were in favor of receiving the vaccine. Other literature has found racial disparities in vaccine uptake for influenza and Tdap (Kriss et al., 2017). We were expecting similar resistance but found none. In general, the pregnancy population has poor uptake of the influenza vaccine (Arnold et al., 2013). It will be important that this same trend does not translate into uptake of the COVID-19 vaccine.

5 | LIMITATIONS

There are limitations to our study. We have a relatively small sample size which makes the results difficult to generalize. Even so, our results provide a snapshot of this populations perception of the COVID-19 vaccine and potential interest in getting vaccinated. Future studies will be able to expand on sample size and provide more in-depth exploration of vaccine concern, knowledge, and uptake. Another limitation is the self-report nature of our qualitative questions. We anticipated a larger qualitative study where we will further explore the themes garnered in this study through more in-depth follow-up semi-structured interviews. Another limitation is the variety of voices collected from difference racial/ethnic groups. We under-sampled maternal voices from the Hispanic community and would rectify this in a future study. A final limitation was the timing of the collection of voices. Our data collection took place before the availability of the Pfizer BioNTech and Moderna vaccines. Because of our data collection timeline, we are uncertain about which participants from the study followed through in getting their COVID-19 vaccine, per their health provider’s recommendation or approval.
CONCLUSION

6.1 Implications for community psychology and public health

The impact of COVID-19 on health, mental and existing health disparities is substantial. Understanding how pregnant women perceive and react to the availability of the COVID-19 vaccine is vital. As with the flu, COVID-19 can have severe consequences on the health of a pregnant mother and her baby. Thus, this population is at particularly high risk for mortality and morbidity due to COVID-19. Because of the risk, finding solutions and removing barriers to the vaccine for pregnant women is important. Our study adds to the literature to help researchers, public health officials and providers understand racial/ethnic maternal voices decisions on seeking knowledge about the vaccine and their decisions around getting vaccinated.

For Community Psychologists and public health researchers, a focus on future studies on COVID-19 vaccine uptake in general should examine upstream factors and social determinants of health (i.e., access, availability, health literacy) that influence vaccine decision-making among this population (Prasanan et al., 2021). Another missing component to this study is the perspective of the provider. Fully understanding how health providers make recommendations, patient risk profile, and assessment will aid in any interventions or efforts to ensure health equity on issues of vaccine decision-making.

As community psychologists, looking at this issue from a socio-ecological framework may help determine the best way to intervene to effect change. Meaning is vaccine hesitancy or decision making most impacted at the individual level, interpersonal level, organizational level, community level, or policy (Bronfenbrenner, 1977; Kolff et al., 2018). Using this framework can help identify where the barriers and facilitators exists in vaccine uptake. This is particularly relevant when thinking about health equity and evaluating evidence-based approaches for health literacy messaging.

The women in our study were concerned about the severity of COVID-19 on their health and the health of their unborn child but were ready to receive the vaccine to protect themselves and their children. While our findings do not focus on those who received the COVID-19 vaccine, this is good news and requires further exploration on how to increase vaccine uptake.

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Research data are not shared.

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