



## Commentary

# COVID-19 Vaccine Hesitancy during the Perinatal Period: Understanding Psychological and Cultural Factors to Improve Care and Address Racial/Ethnic Health Inequities



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From the beginning of the COVID-19 pandemic until December 2021, more than 24,400 pregnant people have been hospitalized with COVID-19 in the United States; however, perinatal vaccination against COVID-19 remains disproportionately low, placing pregnant and postpartum individuals at greater risk for morbidity and mortality from COVID-19. Strikingly low rates of vaccination among pregnant individuals from some racial/ethnic groups highlight pre-existing health care disparities and potentially the presence of unique vaccination concerns among some groups. Despite its significance to public health, an evidence-based understanding of how and why pregnant and postpartum individuals decide to accept the COVID-19 vaccine is lacking. Further, COVID-19 vaccine hesitancy may be related to a larger, concerning presence of medical mistrust that has been magnified in an age of misinformation. Accelerating and prioritizing research that can inform targeted and effective campaigns to increase COVID-19 vaccination among perinatal populations is essential.

## Perinatal COVID-19 Infection Risk and Vaccination

It is now known that pregnant and postpartum women with COVID-19 are at increased risk of severe disease, in comparison with women with COVID-19 who are not pregnant. Further, infants of women with COVID-19 infections may experience poor

neonatal outcomes (Allotey et al., 2020; Angelidou et al., 2021; Chinn et al., 2021; Metz et al., 2021; Villar et al., 2021; Wei, Bilodeau-Bertrand, Liu, & Auger, 2021; Zambrano et al., 2020). For example, pregnant women with COVID-19 experience almost four times the rate of intensive care unit admission and mechanical ventilation, and almost twice the rate of death as nonpregnant women with COVID-19 (Zambrano et al., 2020). As compared with pregnant women without COVID-19, those with COVID-19 are also significantly more likely to experience preterm birth and the neonatal morbidity that is associated with preterm birth (Allotey et al., 2020; Chinn et al., 2021; Metz et al., 2021; Villar et al., 2021). Mitigation efforts, including the widespread uptake of COVID-19 vaccination, are imperative to prevent loss of life and other negative maternal-infant outcomes.

COVID-19 vaccinations have been successful at preventing COVID-19 transmission, hospitalization, severe infection, and COVID-related deaths; moreover, safety data suggest that the vaccine is safe and effective in pregnant and lactating people (Blakeway et al., 2021; Gray et al., 2021; Kachikis et al., 2021; Shimabukuro et al., 2021). Studies evidencing vaccine-triggered immune response among pregnant people and neonatal transfer of antibodies (Gray et al., 2021; Trostle, Aguero-Rosenfeld, Roman, & Jennifer, et al., 2021), alongside data illustrating no increased risks for miscarriage, preterm birth, or stillbirth associated with vaccination (Trostle, Limaye, et al., 2021), have propelled strong recommendations by the American College of Obstetricians and Gynecologists, the Society for Maternal Fetal Medicine, and the Centers for Disease Control and Prevention (CDC) that pregnant individuals and those attempting to become pregnant receive COVID-19 vaccines. However, recent data suggest that pregnant individuals are much more likely to be hesitant about and to refuse the COVID-19 vaccine compared with

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the rest of the adult population (Murphy et al., 2021). As of December 2021, data from the CDC Vaccine Safety Datalink estimated that only 24% of pregnant individuals in the United States had received at least one dose of a COVID-19 vaccine either during or before pregnancy (in comparison with 84% of U.S. adults; CDC, 2021), with rates varying significantly across ethnic/racial group (Asian, 33%; White, 24%; Hispanic, 22%; Black, 17%). Low maternal COVID-19 vaccine coverage may not resolve after birth. Postpartum women also report lower rates of intention to accept the COVID-19 vaccine than nonpregnant women (Sutton et al., 2021), citing similar reasons for COVID-19 vaccine refusal as those reported during pregnancy, such as concerns over safety and efficacy (Goncu-Ayhan et al., 2021; Oluklu et al., 2021). With the significant risk of severe COVID-19 in both pregnant and recently postpartum individuals, as well as the maternal–infant benefits of vaccination, it is crucial to understand psychological contributors to perinatal COVID vaccine uptake.

### COVID-19 Vaccine Hesitancy among Perinatal Populations

Vaccine hesitancy is a leading contributor to low vaccination coverage across a range of diseases (Dubé et al., 2013), contributing to as many as 1.5 million deaths worldwide. Health care decision-making models, such as the theory of planned behavior (Ajzen, 1991), the health belief model (Rosenstock, 1974), and the behavioral model for vulnerable populations (Gelberg, Andersen, & Leake, 2000) include environmental, cultural, and systems-level factors that inform the engagement or rejection of various health behaviors, including vaccination. Theoretically guided research focused specifically on vaccination decisions during pregnancy and postpartum, using these and other vaccination-specific models of health behavior (e.g., the five Cs; Betsch et al., 2018), could help to clarify the reasons for vaccination decisions among perinatal women. Importantly, vaccine hesitancy research with other vaccines (before the COVID-19 pandemic) suggests that pregnant and postpartum individuals' vaccine-specific and disease-specific beliefs, attitudes, and other psychological characteristics represent critical factors in predicting vaccine hesitancy (Kilich et al., 2020). However, despite the recognition of the important role of vaccine hesitancy in determining final behaviors regarding uptake and refusal, little is known about the psychological determinants of COVID-19 vaccine hesitancy among perinatal populations. Recent reviews examining determinants of recommended vaccinations during pregnancy (e.g., pertussis, influenza) have found that perceived maternal–infant risk, questions regarding vaccine efficacy, susceptibility to illness, and lack of knowledge are commonly reported concerns (Adeyanju et al., 2021; Kilich et al., 2020; Qiu, Bailey, & Thorne, 2021).

The current research on perinatal COVID-19 vaccine hesitancy suggests that it is complex and that some vaccine-related attitudes and beliefs may even lead to seemingly inconsistent behavioral choices (Truong, Bakshi, Wasim, Ahmad, & Majid, 2021). For example, although most pregnant individuals report fears of COVID-19 infection and an overwhelming desire to protect one's unborn child, these sentiments can result in either acceptance or refusal of COVID-19 vaccination (Battarbee et al., 2021; Geoghegan et al., 2021). Of relevance to inquiry on this topic are reports of concerns regarding lack of confidence or mistrust in the development and dissemination of the COVID-19 vaccine that are not accounted for by previous vaccine attitudes or behaviors (Ceulemans et al., 2021; Goncu Ayhan et al., 2021; Palamenghi, Barello, Boccia, & Graffigna, 2020; Tram et al., 2021;

Walker, Head, Owens, & Zimet, 2021). Medical mistrust among perinatal samples has been observed regarding medical interventions believed to be understudied and may contribute to health care decisions that run counter to provider-based recommendations (Denton, Creeley, Stavola, Hall, & Foltz, 2020). For example, there is a longstanding history of the exclusion of pregnant people from vaccine clinical trials, despite numerous calls from within academic medicine and obstetric providers and researchers for the inclusion of pregnant participants in early COVID-19 vaccine trials and accountability in the case of vaccine-related injuries (Bardají et al., 2021; Beigi et al., 2021; Halabi, Heinrich, & Omer, 2020). Thus, beliefs about the legitimacy and transparency of medical research may perpetuate maternal distrust of conventional medicine (Hornsey, Lobera, & Diaz-Catalán, 2020). Further, there is evidence that vaccine refusal and hesitancy during pregnancy may predict pediatric vaccine hesitancy (Cunningham et al., 2018; Fuchs, 2016). Therefore, it is essential to understand beliefs and attitudes about the COVID-19 vaccine during the perinatal period, because these may potentially extend to concerns regarding the vaccination of one's child and the subsequent associated health outcomes related to vaccine-preventable disease.

### Vaccine Hesitancy and Racial/Ethnic Health Disparities in Perinatal Populations

Understanding mistrust and barriers to COVID-19 vaccination may be particularly salient for people of color, who have historically faced discriminatory medical treatment, subsequently influencing health care decision-making and creating greater risk for poor health outcomes (Gerend & Pai, 2008; Richard-Davis, 2021). In the United States, health disparities are perhaps most pronounced during the perinatal period, where Black and American Indian women are two to three more times likely to die from pregnancy-related complications as compared with non-Hispanic White women (Petersen et al., 2019). These disparities take on greater urgency in the context of the COVID-19 pandemic, during which higher proportions of Black and Hispanic pregnant individuals have tested positive for COVID-19 in comparison with those who are White (Ellington et al., 2020; Jering et al., 2021). In one Southern U.S. state, for example, a recent report found that Black and Hispanic women accounted for 80% of COVID-19–related deaths among pregnant women, all of whom were unvaccinated (Kasehagen et al., 2021).

Beliefs about vaccinations can vary significantly across racial groups (Wooten, Wortley, Singleton, & Euler, 2013), and it is possible that safety concerns about vaccines and/or medical distrust may disproportionately contribute to COVID-19 vaccine hesitancy among perinatal women of color in comparison with White women. Specific to the COVID-19 vaccines, one study found that Black Americans in general were more likely to believe that the vaccines are unsafe and endorse mistrust of the vaccine than other racial groups (Kricorian, Civen, & Equils, 2021). There is also evidence that greater medical mistrust is associated with greater COVID-19 vaccine hesitancy among Black immune-compromised individuals (Bogart et al., 2021).

Additionally, racial inequities in health care could potentially influence health care decision-making among some perinatal groups. For example, women of color are more likely to report awareness of provider biases that contribute to increased maternal mortality or childbirth related trauma and, in turn, seek alternatives to medical interventions during pregnancy (Proujansky, 2021). To date, there have been no published

studies examining the psychological determinants of COVID-19 vaccine hesitancy among perinatal people, nor any that examined specific factors that may drive vaccine hesitancy or behavior among perinatal individuals from racial/ethnic groups with higher rates of nonvaccination. Without a greater understanding of the drivers of vaccine hesitancy and refusal among perinatal populations, creating sensitive and effective approaches to addressing these issues will be challenging.

### Strategies for Developing Acceptable and Effective Vaccine-Related Interventions

Although the first step in improving the rates of vaccine uptake is conducting research to identify factors influencing vaccine hesitancy among perinatal women—including factors that may be particularly salient for women of color—the ultimate challenge will be developing and implementing evidence-based interventions that lead to vaccine uptake. Interventions to promote vaccine acceptance across the perinatal period would be most effective when using empirically informed targets; that is, psychological factors that are specific to perinatal COVID-19 vaccine hesitancy. Before the COVID-19 pandemic, strategies developed to increase vaccination uptake among perinatal groups have included provider-based communications, education, bedside vaccine administration after childbirth, and evidence-based interviewing techniques; results have been mixed (Brewer et al., 2020; Cheng, Huang, Su, Peng, & Chang, 2015; Gagneur et al., 2018; Hutchinson & Smith, 2020; Mohammed, McMillan, Roberts, & Marshall, 2019; Wong, Lok, & Tarrant, 2016). Provider-delivered vaccine recommendations are consistently cited as significant drivers of vaccine behavior (Beel, Rench, Montesinos, Mayes, & Healy, 2013; Castillo, Patey, & MacDonald, 2021; Wiley, Cooper, Wood, & Leask, 2015). However, there is at least one report of failed intervention efforts to increase COVID-19 vaccination via provider counseling and onsite vaccine access (Hirshberg et al., 2021), suggesting other individual factors likely contribute to COVID-19 vaccine behaviors. Thus, there is a great need for understanding determinants of COVID-19 vaccine hesitancy in the perinatal population to develop efficacious interventions specific to COVID-19 vaccination. Further, understanding perinatal care providers' perspectives regarding helpful versus unhelpful communication strategies—and effective models for integrating vaccine education and communication as well as COVID-19 vaccination into routine clinical care—will provide a critical angle as the field seeks to improve vaccination uptake.

Although major models of behavior and existing studies on COVID-19 vaccine hesitancy take into account individual factors, few studies have used community-based participatory research approaches to investigate psychological determinants that may vary widely across underserved communities. Intervention acceptability and efficacy among marginalized and understudied populations can be improved by using community-engaged, patient-centered research that includes key stakeholders in health care (Collins et al., 2018; Gonzalez et al., 2021). Across health care consumers and providers, there is evidence of trends in COVID-19 vaccine hesitancy that are associated with socio-demographic characteristics (Momplaisir et al., 2021; Waring et al., 2022). Traditional psychology designs, while controlling for sample characteristics, may be enhanced by the input of community members, to fine tune the characteristics that are accounted for in the study design. Specifically, including patients, health care providers, and other stakeholders with

representative views across a range of ethnic/racial groups in all phases of the research process can inform equitable and effective culturally adaptable interventions and health care policy. Further, using narrative and qualitative approaches to data collection can provide expanded and nuanced insight/understanding into complex and often understudied phenomena. Finally, the iterative co-creation of interventions through formative qualitative work and community-based participatory research may provide much-needed flexibility when conducting research within the rapidly changing landscape of COVID-19 prevention, mitigation, and treatment. As such, research that directly engages community members and stakeholders may improve the typically sluggish lines of communication that can exist between bench science and the community at large. More streamlined communication can ultimately result in a deeper understanding and prioritization of community needs, which can increase trust and improve care.

### Addressing COVID-19 Vaccine Hesitancy to Promote More Equitable Health Care Use

To develop a robust and effective health care system that provides equitable care to all perinatal patients, it is essential to understand how trust and other psychological determinants of COVID-19 vaccine hesitancy may shape pregnant individuals' vaccination intentions and behavior—which could potentially impact future vaccination decisions with their children. Listening to and understanding patient concerns and provider insights—both in the clinical realm and through dedicated research—will help to uncover patient's experiences and attitudes that may shape care decisions in the era of COVID-19, including any specific concerns, fears, or misinformation that could serve as barriers to vaccination. Such research is essential to improve the care for all perinatal people, and we believe it may be particularly critical in strengthening systems of care for women of color who face greatest risk for poor outcomes due to COVID-19.

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