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COVID-19 Vaccination Hesitancy in Pregnancy: A Retrospective Cohort Study of Patients' Perceptions

Molly Schassberger

University of New England College of Osteopathic Medicine, mschassberger@une.edu

Charlotte Kirk

University of New England College of Osteopathic Medicine, ckirk2@une.edu

Samantha Fields

University of New England College of Osteopathic Medicine, sfields2@une.edu

Carol Brenner

University of New England College of Osteopathic Medicine, cbrenner1@une.edu

Andrea M. Bodine MD

bodineandrea@gmail.com

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Abstract

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Schassberger¹, M, MS III, Kirk¹, C, MS III, Fields¹, S, MS III, Brenner¹, C, Ph.D., Bodine², A, M.D.

¹University of New England College of Osteopathic Medicine, Biddeford, Maine

²Berkshire Medical Center, Pittsfield, Massachusetts

Introduction: The COVID-19 vaccination rate of US pregnant individuals of childbearing age was 42.3%, compared to 63.7% of the total population as of 1/15/2022 despite ACOG and CDC recommendations. Our objectives were to determine patients' perceptions on COVID-19 vaccine safety and efficacy around the time of pregnancy, vaccine information sources, and to compare patients' COVID-19 vaccination rates around the time of pregnancy to other vaccinations. The study goal was to inform providers of patients' perceptions regarding COVID-19 vaccinations.

Methods: We conducted a retrospective cohort study at a community teaching hospital. Patients with ICD-10 codes for pregnancy during 2021 were emailed an anonymous survey gathering information regarding perceptions of COVID-19 vaccine around the time of pregnancy. Chi square testing was used for significance.

Results: The survey was emailed to 1444 patients; 265 responses were obtained over seven days. Participants who did not receive the vaccine were concerned the vaccine made pregnancy less safe. Participants thought there was insufficient research regarding the vaccine and pregnancy. Unvaccinated participants obtained information from friends/family, social media, and internet forums while those vaccinated obtained information from the CDC and providers. Participants were more likely to receive COVID-19 vaccination than other vaccinations. Unvaccinated participants were less likely to receive influenza vaccines.

Conclusions: Patients have concerns regarding safety and efficacy of COVID-19 vaccination around the time of pregnancy. Individuals who chose to get the vaccination more likely obtained information from providers or the CDC. Those who were not vaccinated were less likely to receive influenza vaccines and other vaccines during their pregnancies.

Keywords

COVID-19 vaccination, vaccination hesitancy, pregnancy

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Conflict of Interest Statement

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ORIGINAL ARTICLE

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Molly Schassberger^{a,*}, Charlotte Kirk^a, Samantha Fields^a,
Carol Brenner^a, Andrea Bodine^b

^a University of New England College of Osteopathic Medicine, Biddeford, ME, USA

^b Berkshire Medical Center, Pittsfield, MA, USA

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1. Introduction

According to data from the Centers for Disease Control and Prevention (CDC), only 42.3% of pregnant individuals of childbearing age (18–49 years old) in the United States were fully vaccinated against COVID-19 as of January 15, 2022,¹ compared to 63.7% of the total United States population fully vaccinated against COVID-19.² This disparity in vaccination status comes despite recommendations from the CDC, American College of Obstetricians and Gynecologists, and American College of Osteopathic Obstetricians and Gynecologists, all of which are in agreement in their recommendations

of mRNA COVID-19 vaccination for pregnant individuals.^{3–6} The FDA approved mRNA Pfizer-BioNTech COVID-19 Vaccine (approved August 23rd 2021) and Moderna COVID-19 Vaccine (approved January 31st 2022) for all individuals over the age of 18. The FDA included approval for pregnant individuals in February 2022.⁷

Prevention of COVID-19 infection is an evolving healthcare concern, particularly for those at heightened risk for adverse outcomes, including pregnant individuals.⁸ COVID-19 erupted abruptly in the United States in early 2020 leading to 148,327 documented cases of COVID-19 in pregnant individuals in the United States between January 2020 and

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* Corresponding author.
E-mail address: mschassberger@une.edu (M. Schassberger).

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November 2021.⁹ COVID-19 infection in pregnant individuals has been shown to increase the risk of poor outcomes,¹⁰ including preeclampsia or eclampsia,¹¹ severe infection, admission to intensive care unit, preterm birth,^{12,13} and maternal death,⁹ when compared to pregnant individuals who have not contracted COVID-19.⁹⁻¹³ Studies also indicate increased rates of stillbirth and fetal death in pregnant individuals with COVID-19 compared to those without infection.⁹ Between March 2020 and December 2021, pregnant individuals accounted for 29.1% of COVID-19-associated hospitalizations in the US.¹⁴ That number is compared to 8.9% of adults with no known comorbidities. During this same time hospitalization rates in pregnant individuals with COVID-19 were higher than individuals suffering from medical conditions such as asthma, chronic lung disease, renal disease, and immunosuppression.¹⁴

Studies have shown decreased rates of severe illness and hospitalizations in vaccinated individuals compared to non-vaccinated individuals, since COVID-19 vaccinations have become available.¹⁵ According to the CDC, during October and November of 2021, unvaccinated individuals were 4.0 times more likely to contract COVID-19 infections than fully vaccinated individuals and 12.7 times more likely to die of COVID-19 infection complications.¹⁵ These numbers increase to 13.9 and 53.2 times the risk when comparing unvaccinated individuals to those who are fully vaccinated with booster doses.¹⁵ More recent studies have found no association between COVID-19 vaccination and increased risk for preterm birth or small gestational age.¹⁶ Additionally, studies have shown the risk of spontaneous abortion is similar in individuals who received COVID-19 vaccination, either before conception or during pregnancy to those who are not vaccinated against COVID-19.¹⁷ As evidence regarding COVID-19 vaccination during pregnancy

grows, studies continue to show the benefits of vaccination outweigh any potential risks.^{3,4}

Despite increasing vaccination rates among pregnant individuals, these rates remain low compared to non-pregnant individuals.^{1,2} Our project aimed to investigate the disparity in COVID-19 vaccination rates between pregnant individuals and those in the general population by examining the views of pregnant and recently pregnant patients toward COVID-19 vaccination through an anonymous survey. Our primary objective was to explore patients' perceptions of COVID-19 vaccination safety and efficacy administered around the time of pregnancy. Our secondary objective was to investigate where patients receive vaccine information around the time of pregnancy. Our tertiary objective was to compare patients' vaccination rates around the time of pregnancy for COVID-19 to rates for other diseases. Our primary hypothesis was that there are concerns regarding COVID-19 vaccination effects on pregnancy. Our secondary hypothesis was that individuals choosing not to receive COVID-19 vaccination were least likely obtaining information regarding vaccines from the CDC or their physicians. Our tertiary hypothesis was that the rate of COVID-19 vaccination around the time of pregnancy would be lower than the rate of vaccination recommended for other diseases. The study aimed to provide health care professionals with the knowledge to address this population's perceptions regarding COVID-19 vaccinations and to educate and encourage acceptance of future vaccinations.

2. Methods

2.1. Study design

We conducted a retrospective cohort study to survey patients who were pregnant during 2021

Table 1. Perceptions of vaccine safety and efficacy.

Survey Questions	Response Percentages					
Vaccine Willingness Likert Scale: 1 to 5	1 (<i>did not want vaccine</i>) 10.2%	2 6.1%	3 17.4%	4 18.9%	5 (<i>actively sought out vaccine</i>) 47.4%	
FDA Approval	<i>No effect</i> 39.9%	<i>Must be approved</i> 44.9%	<i>Other</i> 15.2%			
Vaccine Effect on Pregnancy	<i>Safer</i> 60.9%		<i>Less Safe</i> 18.0%		<i>No affect</i> 21.1%	
Sufficient Research	<i>Yes</i> 24.6%	<i>Maybe</i> 17.8%	<i>No</i> 43.6%	<i>Not Sure</i> 14.0%		
Vaccine importance post-infection	<i>Yes</i> 62.3%	<i>No</i> 19.6%	<i>I'm not sure</i> 18.1%			
Ideal timing of vaccine	<i>Before pregnancy</i> 44.9%	<i>First trimester</i> 4.2%	<i>Second trimester</i> 11.1%	<i>Third trimester</i> 9.8%	<i>After pregnancy</i> 20.2%	<i>Refused</i> 9.8%

regarding their thoughts about the safety and efficacy of COVID-19 vaccination, where they obtain vaccine information, and rates of recommended vaccination around the time of pregnancy. The study was conducted at Berkshire Medical Center (BMC) in Pittsfield, Massachusetts between the dates of January 1, 2021, and December 31, 2021. Institutional Review Board exemption was obtained from both BMC and the University of New England College of Osteopathic Medicine.

Patients receiving obstetric and gynecological care at BMC were screened for eligibility. The BMC Electronic Medical Record (EMR) identified patient charts with ICD10 codes for pregnancy between the dates of January 1, 2021, and December 31, 2021, and birth dates between December 31, 1971, and January 1, 2003. Participant identifiers were stored in a secure database. Eligible participants were between 18 and 50 years old who were pregnant or recently pregnant. Duplicate patient names and those without an email listed were excluded.

Eligible participants were emailed a survey (see appendix a) using an anonymous online survey platform, along with a description of the purpose of the survey, study team contact information, and informed consent. The initial email was sent with a follow-up email three days later to each eligible participant. The survey was closed seven days following the initial email. The survey was anonymous, completely voluntary, and self-administered. It consisted of 16 quantitative (using a Likert scale) and qualitative questions and took approximately five minutes to complete. The questions in the survey included demographics (age, race, education), vaccine status (COVID-19, influenza, and receipt of other vaccines), information sources regarding the COVID-19 vaccine, and thoughts on the COVID-19 vaccine effect on maternal and fetal health.

2.2. Statistical analysis

Statistical analyses were performed using Minitab18. Statistical significance was considered with $p < 0.05$. Descriptive statistics including frequencies, percentages, means, and standard deviations, were used to analyze participants' demographic characteristics, pregnancy status, and vaccine status for COVID-19 and other diseases. Hypotheses were analyzed using chi-square tests.

For analysis of hypothesis one we used survey questions 5, 13, and 14. Survey questions 5 and 13 were compared to investigate if patients who did not receive the COVID-19 vaccine have concerns that the vaccine makes pregnancy less safe, while questions 5 and 14 were compared to investigate if

patients who did not receive the COVID-19 vaccine have concerns that there is not enough research. For analysis of hypothesis two we used questions 5 and 12. To evaluate the relationship between vaccine hesitancy and patients' vaccine information sources, we compared survey question 5 to each of seven possible response options on survey question 12. For analysis of hypothesis three, we used survey questions 5, 7, and 8. Survey questions 5 and 7 were examined to compare respondents' COVID-19 vaccination rates around the time of pregnancy to their rates of any vaccine around the time of pregnancy. Additionally, questions 5 and 8 were used to compare respondents' COVID-19 vaccination rates around the time of pregnancy to annual flu vaccinations.

3. Results

A link to the survey was emailed to the 1444 eligible patients. During the seven-day period that the survey link was active, 265 BMC patients participated by completing the survey. One survey responder indicated she was under the age of 18, though the survey was only sent to patients documented in the EMR to be above 18. Therefore, her results were included, giving a total of 265 participants for a survey response rate of 18.4%.

Demographics of the respondents showed 234 (88.6%) were White or Caucasian, 15 (5.7%) were Hispanic or Latino, 8 (3.0%) were Black or African American, 3 (1.1%) were Asian or Asian American, 0 (0.0%) were American Indian or Alaskan Native, and 4 (1.5%) reported being a race other than those listed. Of the participants, 93 (35.4%) reported having a bachelor's degree, 86 (32.7%) had a graduate degree, 44 (16.7%) reported completing some college, 17 (6.5%) had an associate's degree, 17 (6.5%) had a high school diploma, and 6 (2.3%) had a GED. There were two participants who did not respond to this question.

When asked about pregnancy status, 68 participants (25.8%) reported being currently pregnant and 196 (74.2%) reported being pregnant during 2021 making them eligible for the survey. There were 6 (2.3%) in the first trimester, 13 (4.9%) in the second trimester, and 49 (18.6%) in the third trimester of pregnancy. There were 223 (85.1%) who reported receiving the COVID-19 vaccine and 39 (14.9%) did not receive the COVID-19 vaccine.

Analysis of objective one was performed by separating vaccination safety from efficacy. To determine perceptions on COVID-19 vaccination safety around the time of pregnancy, participants were asked questions regarding willingness to

receive the vaccine, how FDA approval affects willingness to receive the vaccine, how participants think the vaccine affects pregnancy, and thoughts about the amount of research regarding the vaccine in pregnancy. Participants were asked on a sliding scale of 1–5, “with 1 being ‘I do not want the vaccine no matter what’ and 5 being ‘I actively sought out the vaccine as soon as I could’, where do you fall?”. Results indicated 27 (10.2%) participants reported they did not want the vaccine no matter what. There were 16 (6.1%) who reported “2”, 46 (17.4%) who reported “3”, 50 (18.9%) who reported “4”. There were 125 (47.4%) who reported actively seeking out the vaccine. When asked if FDA approval affected participant opinion on receiving the COVID-19 vaccine, 105 (39.9%) reported it did not affect their opinion, 118 (44.9%) reported the vaccine must have approval or they would not get it, and 40 (15.2%) reported “other”. When participants were asked about how being vaccinated against COVID-19 affects pregnancy, 159 (60.9%) reported they thought being vaccinated against COVID-19 would make the pregnancy safer, 47 (18.0%) reported they thought it would make the pregnancy less safe, and 55 (21.1%) reported they did not think it would affect the pregnancy. Participants were also asked if they thought there is enough research/data regarding COVID-19 vaccine safety/efficacy in pregnancy, to which 65 (24.6%) reported yes, 47 (17.8%) reported maybe, 115 (43.6%) reported no, and 37 (14.0%) reported they weren't sure.

To determine perceptions on COVID-19 efficacy in pregnancy, participants were asked questions on which trimester of pregnancy the vaccine should be received during and the importance of vaccination after a prior COVID-19 infection. Participants were asked if they had to receive the COVID-19 vaccine around the time of pregnancy, when would be the preferable time to receive it. 118 (44.9%) reported they would choose to get the vaccine before becoming pregnant, 11 (4.2%) said during the first trimester, 29 (11.1%) said during the second trimester, 26 (9.8%) said during the third trimester, 53 (20.2%) said after birth, and 26 (9.8%) reported they would not receive the COVID vaccine no matter what scenario. When asked if participants felt it was important to get the COVID-19 vaccine if they already had COVID-19 infection, 165 (62.3%) responded “yes”, 52 (19.6%) responded “no”, and 48 (18.1%) responded “I'm not sure”. We found statistical significance among patients who did not receive the COVID-19 vaccine and those concerned the vaccine makes their pregnancy less safe ($p < 0.001$). Similarly, we observed statistical significance among patients who did not receive the

COVID-19 vaccine and those who had concerns there is not enough research regarding the vaccine in pregnancy ($p < 0.001$) (Table 1).

Participants were asked to indicate where they received COVID-19 vaccine information. Of the 265 participants, 226 (85.3%) reported getting information from the CDC and 211 (79.6%) received information from their physician. Other choices participants chose included, friends/family, 101 (38.1%), social media, 53 (20.0%), news outlets, 113 (42.6%), internet forums, 43 (16.2%), and other, 25 (9.4%). Participants who were not vaccinated received vaccine information from friends/family ($p = 0.003$), social media ($p = 0.002$), and internet forums ($p = 0.00$). These comparisons were found to be statistically significant, indicating those who chose not to get vaccinated against COVID-19 were more likely to receive vaccine information from friends and family, social media, and internet forums. Participants who were not vaccinated were less likely to report receiving vaccine information from the CDC ($p = 0.28$), their physician ($p = 0.67$), or news outlets ($p = 0.067$). These comparisons were not found to be statistically significant.

To compare patient's vaccination rates around the time of pregnancy for COVID-19 compared to other recommended vaccinations, participants were asked questions regarding lifetime vaccination, other vaccinations during pregnancy, and annual flu vaccination. When asked if participants had received other vaccines during their lifetime, 260, 98.9%, responded “yes”, and 3, 1.1%, responded “no”. When asked if they had received other vaccines during any pregnancy, 205, 77.6%, responded “yes”, 48, 18.2%, responded “no”, and 11, 4.2%, responded “I'm not sure”. When asked if they typically receive an annual flu vaccine 160, 60.4%, responded “yes”, 64, 24.1%, responded “no”, and 41, 15.5%, responded “sometimes”. COVID-19 vaccination rates around the time of pregnancy relative to other vaccinations throughout these patients' lives could not be analyzed as only three indicated they had never received any vaccine in their lifetime. We observed more patients would receive any vaccine around the time of pregnancy at a different rate as the COVID-19 vaccine around the time of pregnancy ($p < 0.001$). Additionally, comparison of patients' COVID-19 vaccination rates around the time of pregnancy relative to annual influenza vaccinations was statistically significant, revealing patients were more likely to receive COVID-19 vaccination than flu ($p < 0.001$).

Question 16 of the survey allowed participants to openly report any comments or concerns they have regarding how the COVID-19 vaccine may affect

their baby. One hundred forty-six participants answered this question. Responses varied. Thirty-seven participants stated they had no concerns regarding how the COVID-19 vaccine would affect their baby while 10 participants stated they did have concerns about how it would affect their baby. Other participants provided more elaborate answers. Of those without concerns regarding how vaccination against COVID-19 would affect their baby, many expanded that they were more concerned about contracting COVID-19 while pregnant or were not concerned in general but wanted to wait until they were past their first trimester. Six participants commented that the COVID-19 vaccine may negatively affect fertility and lactation. Of the participants who expressed concerns about how the COVID-19 vaccine may affect their baby during pregnancy, 24 wrote they felt the vaccine was unsafe and/or there had not been enough research to determine efficacy and safety immediately and long term.

4. Discussion

General disbelief in vaccines have been found to be associated with vaccine hesitancy.²⁵ Our study found more specific concerns regarding COVID-19 vaccination around the time of pregnancy led to vaccine hesitancy in unvaccinated pregnant individuals. Patients who did not receive COVID-19 vaccination perceived there was insufficient research regarding the safety and efficacy of COVID-19 vaccination around pregnancy. One participant wrote concerns about potential lifetime health issues for her baby. Patients who did receive COVID-19 vaccination felt the vaccine made their pregnancy safer, as indicated by a patient's comment, "I believe that it protects my baby and gives them the antibodies they need". Of the 85.1% of participants reporting receipt of COVID-19 vaccination, 55.7% responded that they actively sought the vaccine, suggesting 44.3% of participants who are vaccinated against COVID-19 experienced some level of hesitancy regarding vaccination. This satisfied our hypothesis that there are concerns regarding COVID-19 vaccination effects on pregnancy, as respondents who did not receive the vaccine indicated they felt there was insufficient research regarding the vaccine and pregnancy. We found patients who did not receive the COVID-19 vaccine were more likely to receive information about the vaccine from family and friends, social media, internet forums, and other sources, and less likely to obtain information regarding vaccines from the CDC or their physicians, satisfying our

hypothesis about sources of vaccine information for these patients. Further, we found patients who did not receive the COVID-19 vaccine around the time of pregnancy also did not receive other vaccines during pregnancy and do not typically receive an annual influenza vaccination. We could not support our hypothesis that the vaccination rate for COVID-19 around the time of pregnancy would be lower than the rate of vaccinations for other diseases, as the vaccination rate for COVID-19 among participants was 85.1%. We know all participants who received the vaccine did so within a year of pregnancy, though the percentage of participants who received this vaccine during pregnancy is unknown. Therefore, we can say that the COVID-19 rate around the time of pregnancy in this population was higher than the rate of other vaccinations during pregnancy (77.7%). We can conclude that individuals who chose not to receive the COVID-19 vaccine were also less likely to receive additional vaccines while pregnant and annual influenza vaccines.

Our findings varied from current vaccination rates for pregnant individuals nationally; 85.1% for participants in our study compared to 42.3% for pregnant individuals as of January 15, 2022.¹ Prior to our study, literature lacked information regarding perceptions of COVID-19 vaccination around the time of pregnancy. Recent studies have attributed vaccination hesitancy to exclusion of pregnant individuals in initial clinical vaccination trials.^{18,19}

Data regarding COVID-19 vaccination effects on pregnant individuals originally was limited to inadvertent early pregnancy exposure.²⁰ Several studies have now been conducted further to examine vaccination exposure and birth outcomes. Fell et al., 2021, and Magnus et al., 2022, investigated the safety of second and third-trimester mRNA vaccinations, focusing on minimizing bias in their approaches.²⁰⁻²² These studies suggested there were no safety concerns with the vaccine, aiming to reassure pregnant individuals, or those planning to become pregnant of its safety.^{21,22}

Studies showing the safety and efficacy of COVID-19 vaccination for pregnant individuals have been insufficient to minimize the disparity of vaccination rate in pregnant individuals compared to non-pregnant individuals. Focusing analysis on the reasons behind vaccination hesitancy has shown those who experience barriers to accessing health-care report higher levels of vaccine hesitancy.²³⁻²⁶ These barriers include socioeconomic factors, such as lower education status, public health insurance, and reported substance abuse, and demographic factors, including non-Hispanic Black race and

younger age.²⁶ Our research did not specifically compare race or education level to vaccination status. Respondents consisted of predominantly White or Caucasian individuals with high education levels and reported higher vaccination rates than are found on average nationally. The demographic makeup of our study likely skewed the vaccination rates reported in the survey.

Sources of vaccination information play a role in vaccine hesitancy. Citu et al., 2022 noted correlation between vaccine hesitancy and trusting social media sources, consistent with our study results.²⁵ Studies have shown those who thought the vaccine was beneficial for their future child were less likely to report vaccination hesitancy. Those who experienced higher levels of hesitancy reported a lack of information about the vaccine and fear of adverse fetal and maternal outcomes (including infertility) to be the primary reasons for their hesitancy, consistent with our study.^{18,23–26} We found many individuals who did not receive the vaccine reported concerns with vaccination effects on fetal health as well as maternal fertility and breastfeeding abilities. There have been similar findings regarding the level of vaccination hesitancy with regards to race, education status, social media sources, and perception of vaccine effect on maternal and fetal outcomes.^{18,23–26}

Our survey results exhibit valuable insight into the thoughts and perceptions of pregnant or recently pregnant individuals about COVID-19 vaccination safety and efficacy, their sources of vaccine information, and vaccination rates. The implications of these findings suggest that healthcare professionals playing a more significant role in vaccination education efforts may lead to increased COVID-19 vaccination rates. Increasing pregnant individuals' exposure to CDC vaccination resources may have similar effects.

Strengths of our study included the brevity of the survey with a broad range of questions relating to vaccine hesitancy. We had a high survey response rate of 18.6%. Limitations of our study included assumptions made regarding COVID-19 vaccination timing. All vaccinated survey participants received the vaccine within a year of pregnancy, though they may have received it before pregnancy, while pregnant, or after delivery. Another limitation was respondents were predominantly Caucasian with higher education levels than reported nationwide. These demographic factors likely influence the results of the study.

Future studies may be performed in regions with a larger variety of participants' racial and educational backgrounds to compare findings nationwide.

Additionally, including specific questions regarding vaccine hesitancy due to perceived effects on patients' fertility and breastfeeding would be beneficial for targeting future patient education strategies.

5. Conclusion

The clinical implications of this study suggest healthcare professionals serve as a primary source of vaccine information for vaccinated individuals and should continue to encourage appropriate vaccination recommendations for their pregnant patient populations. Healthcare professionals could impact vaccination rates in this population.

Concerns exist regarding safety and efficacy of COVID-19 vaccination around the time of pregnancy. Individuals who choose to get vaccinated against COVID-19 are more likely to obtain vaccine information from their physicians or the CDC, while those who choose not to be vaccinated are more likely to receive information from family and friends, social media, and internet forums. Survey participants who were not vaccinated against COVID-19 were less likely to receive annual influenza vaccines and other recommended vaccines during their pregnancies.

Conflict of Interest Statement

None of the authors has a financial disclosure or other conflict of interest to disclose. This project received funding from the Carmen Pettapiece Student Research Fellowship.

Appendix A. Survey

1. Age

- Under 18
- 18-24
- 25-30
- 35-40
- 40+

2. Race

- White or Caucasian
- Black or African American
- Hispanic or Latino
- Asian or Asian American
- American Indian or Alaska Native
- Another race

3. Education

- GED
- High School
- Some College
- Associates Degree
- Bachelor's Degree
- Graduate Degree

4. I am ____ weeks pregnant.
 - Less than 13 weeks (first trimester)
 - 13–28 weeks (second trimester)
 - 29 weeks - delivered (third trimester)
 - I'm not sure
 - I'm not currently pregnant
5. Did you get the COVID-19 vaccine?
 - Yes
 - No
 If not, why? _____
6. Have you received other vaccines during your lifetime?
 - Yes
 - No
 - I'm not sure
 - Other (please specify) _____
7. Have you received other vaccines during ANY pregnancy?
 - Yes
 - No
 - I'm not sure
8. Do you typically receive an annual flu vaccine?
 - Yes
 - No
 - Sometimes
9. On a scale of 1–5, with 1 being “I DO NOT want the COVID vaccine no matter what” and 5 being “I actively sought out the COVID vaccine as soon as I could”, where do you fall along the scale?
 - 1
 - 2
 - 3
 - 4
 - 5
10. Do you feel it is important to get the COVID-19 vaccine if you have already had COVID-19 infection?
 - Yes
 - No
 - I'm not sure
11. How does FDA approval affect your opinion?
 - It doesn't
 - The vaccine must have approved or I won't get it
 - Other (please specify) _____
12. Where do you get your information about the COVID-19 vaccine? Check all that apply.
 - The CDC
 - My physician
 - My friends/family
 - Social media
 - News outlet
 - Internet forums
 - Other (please specify) _____
13. I think being vaccinated against COVID affects pregnancy by:
 - Making the pregnancy more safe
 - Making the pregnancy less safe
 - Not affect the pregnancy either way
14. Do you feel there is enough research/data surrounding COVID-19 vaccine safety/efficacy in pregnancy?
 - Yes
 - Maybe
 - No
 - I'm not sure
15. If I had to get the COVID-19 vaccine, I would choose to get it _____.
 - Before becoming pregnant
 - In the first trimester
 - In the second trimester
 - In the third trimester
 - After having my baby
 - I would refuse the COVID vaccine no matter what scenario
16. Do you have any concerns about how the COVID-19 vaccine may affect the baby?

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