RESEARCH ETHICS

J. Heal Ethics Admin
Volume 8 | Number 1 (Spring 2022)
www.jheaonline.org
ISSN 2474-2309 | doi:10.22461/jhea.1.71633
https://doi.org/10.22461/jhea.1.71633
Published May 16, 2022

Ethical and Practical Implication of COVID-19 Vaccine among Pregnant Women

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Abstract: *According to the CDC Health Alert Network, as of September 27, 2021, more than 125,000 confirmed laboratory cases of COVID-19 were reported among pregnant women that resulted in more than 22,000 hospitalized cases and 161 deaths, with the highest death toll of 22 women in the month of August 2021 alone. There are many adverse pregnancy outcomes that have been reported among pregnant women who have contracted COVID-19 including severe illness, stillbirth, preterm birth, neonates' hospital admissions into Intensive Care Units (ICUs), and death. Just one-third of pregnant women were fully vaccinated before or during pregnancy as of mid-September 2021. Evidence about the safety and effectiveness of COVID-19 vaccination during pregnancy, although limited, has been growing. The COVID-19 vaccine is recommended for pregnant women and those who are breastfeeding. This study examines ethical and practical implications of the COVID-19 vaccine among pregnant women. In this paper, we reviewed and presented 16 cases of pregnant women who were either vaccinated or unvaccinated against COVID-19 and share their health outcomes as retrieved from media sources. The findings mirror what the literature reports on the state of COVID-19 among pregnant women. Negative outcomes reported in the literature were also reported in our case reviews. This study presents a framework that will guide providers with messaging and provide information to help pregnant women make informed decisions about getting the COVID-19 vaccine.*

Keywords: *Pregnancy, COVID-19, COVID-19 Vaccine, Ethical Implications*

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+To cite this article: Kimunai, E., Mshigeni, S., Sarwar, E. "*Ethical and Practical Implication of COVID-19 Vaccine among Pregnant Women*". *The Journal of Healthcare Ethics & Administration* Vol. 8, no. 1 (Spring 2022): 1-12, https://doi.org/10.22461/jhea.1.71633

I. INTRODUCTION

Pregnancy is said to be one of the most critical phases in the life of a woman when the body undergoes major transitions biologically, physically, mentally, emotionally, as well as psychologically as one prepares for the birth of a child (Slade & Sadler, 2019). These changes put pregnant women into a group of *vulnerable populations* and, as such, careful precautions and medical advice from their medical providers become an essential part of their health regimen for a period of ten months. Over the past 2 years, the world has experienced a new infectious disease (COVID-19) caused by a virus (SARS-CoV-2) which is spread when an infected person breathes out droplets and passes them on to another person via eyes, noses, or mouth (CDC, 2021a). With the current fight against COVID-19, the *American College of Obstetricians and Gynecologists* (ACOG) as well as the *Centers for Disease Control and Prevention* (CDC) highly encourage all pregnant women, people who are thinking about becoming pregnant, and those breastfeeding to get vaccinated and protect themselves against COVID-19 (ACOG, 2021; CDC, 2021b). Despite any long-term side effects of vaccines, the move to advocate for the COVID-19 vaccine among pregnant women has and continues to become an essential debate in the field of public health and healthcare, with the goal of preventing the disease and premature deaths as a result of viral infection.

According to the CDC Health Alert Network, as of September 27, 2021, more than 125,000 confirmed laboratory cases of COVID-19 were reported among pregnant women which resulted in more than 22,000 hospitalized cases and 161 deaths, with the highest death toll of 22 women in the month of August 2021 alone (CDC-HAN, 2021). Further surveillance from COVID-NET reported that at least 97% women hospitalized with COVID-19 were unvaccinated (CDC, 2020) and that racial/ethnic disparities in vaccination coverage do exist among this vulnerable population (CDC-HAN, 2021). Further, the CDC informs that there are other adverse pregnancy outcomes. Severe illness, stillbirth, preterm birth, neonates hospital admissions into Intensive Care Units (ICUs) and, additionally, death have been reported (CDC-HAN, 2021). For the many unknown health outcomes that pregnant women and their unborn or born children that may survive the infection from the novel coronavirus face, it is imperative for healthcare professionals to follow the science and continue recommending vaccination against the disease among pregnant women.

Hence this study examines ethical and practical implications of the COVID-19 vaccine among pregnant women. The study presents a framework that will help providers with messaging when providing information that will assist pregnant women in making informed decisions about COVID-19 vaccination.

II. LITERATURE REVIEW

There are many unknowns that pregnant women are facing during the COVID-19 pandemic. The normal physiological, anatomical, and immunological changes that accompany pregnancy may increase a pregnant woman's susceptibility to a newly emergent viral pathogen as well as increase the severity of infection (Chen, 2020; Breslin, 2020; Zaigham, & Andersson, 2020; Schwartz, & Dhaliwal, 2020). These changes, which consists of an adaptive immune state (including local suppression of cell-mediated immunity), and modifications in the maternal cardiovascular and respiratory systems (including increased oxygen consumption, heart rate, stroke volume, decreased lung capacity, and other physiological changes), may increase the likelihood for severe maternal illness from an infectious disease, especially with those that have respiratory transmission (Dashraath, et. al., 2020; Jamieson, Theiler, & Rasmussen, 2006; Sappenfield, Jamieson, & Kourtis, 2013; Schwartz, 2020a; Schwartz, 2020b).

The impact of SARS-CoV-2 in pregnancy remains to be fully determined, and a concerted, global effort is required to determine the effects on implantation, fetal growth and development, labor, and neonatal health (Wastnedge, et. al., 2021). Furthermore, because pregnant women were excluded from the initial phase 3 clinical trials of COVID-19 vaccines, limited data are available on their efficacy and safety during pregnancy. The monitoring of COVID-19 vaccination during pregnancy is ongoing. According to the CDC (2021c), evidence about the safety and effectiveness of COVID-19 vaccination during pregnancy, although

limited, has been growing. It suggests the benefits of receiving a COVID-19 vaccine outweigh any known or potential risks of vaccination during pregnancy. COVID-19 vaccines do not cause COVID-19 infection, including in pregnant people or their babies. In addition, COVID-19 vaccination is recommended for people who are breastfeeding (CDC, 2021c).

Issues to be considered when counseling pregnant women include early findings and data currently available from ongoing clinical trials, potential risks to pregnancy of vaccine reactogenicity, timing of vaccination during pregnancy, evidence for safety of other vaccines during pregnancy, risk of COVID-19 complications due to pregnancy, existing underlying conditions, risk of exposure to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and any potential for risk mitigation (Rasmussen, et. al., 2021). As additional information from clinical trials and from data collected on vaccinated pregnant women becomes available, it will be critical for obstetricians to keep up to date with this information. As of today, there is a dearth of research related to the ethical and practical implications of COVID vaccination among pregnant women.

III. METHODOLOGY PARAGRAPH OR STATEMENT

In this paper, we reviewed and presented 16 cases of pregnant women who were either vaccinated or unvaccinated from COVID-19 and share their health outcomes as retrieved from media sources. Specifically, we reviewed cases retrieved from newspapers and television channels in 2021. Following Theoretical saturation guidelines, we stopped at 16 cases after reaching our data saturation drawn from a quite homogeneous population (Boddy, 2016). In our analysis, we shared their demographics characteristics (age, race/ethnicity), geographical location, COVID-19 vaccination status, and mother & baby outcome.

Case 1 (**August 2021:** Source – NBC4 Los Angeles, 14 Sept. 2021): A 43-year-old, Hispanic, pregnant woman from Victorville, California was hospitalized with COVID-19 in mid-August. She was not vaccinated from COVID-19 since *she was unsure about it and was afraid that the shot would negatively affect the baby*. As her condition worsened, she was admitted to the hospital, placed on the ventilator, and lost her baby (stillbirth) but she luckily survived. (*Source*: https://www.msn.com/en-us/health/medical/victorville-woman-hospitalized-battling-covid-after-suffering-miscarriage/ar-AAOrY8a?ocid=sw).

Case 2 (**October 2021:** Source – TIMES of San Diego, 8 Oct. 2021): An unvaccinated pregnant woman and her unborn child were the first to die from COVID-19 in San Diego county after being hospitalized. Her age or racial background were not reported to protect her family's privacy; however, this story was shared by local media sources and county with the goal of encouraging anyone who is pregnant or plans to get pregnant to get the vaccine. (*Source*: https://timesofsandiego.com/health/2021/10/08/county-reports-first-covid-death-of-unvaccinated-pregnant-woman/).

Case 3 (**October 2021**: Source – The Washington Post, 7 Oct. 2021): A 32-year-old, Hispanic, pregnant woman from Joshua, Texas was hospitalized as a result of COVID-19 infection. She was not vaccinated out of concerns for the baby that she never got to hold. She died from coronavirus complications within days of giving birth while on a ventilator; fortunately, her baby survived. (Source: https://www.washingtonpost.com/health/2021/10/05/unvaccinated-pregnant/)

Case 4 (**September 2021**: Source – USA Today, 24 Sept. 2021): A 31-year-old, African American pregnant woman from Phoenix, Arizona was hospitalized as a result of COVID-19 infection. She was *not vaccinated* as shared by family sources but *had planned to get vaccinated after giving birth*. Ten days after delivery, she died from coronavirus complications; fortunately, her baby survived. (Source: https://www.usatoday.com/story/news/nation/2021/09/24/pregnant-woman-dies-covid-days-after-emergency-c-section/5845094001/)

Case 5 (**October 2021**: Source – U.S. News, 19 Oct. 2021): A 29-year-old Caucasian pregnant woman of Midland, Georgia suffered a stillbirth after becoming ill with COVID-19. She *was unvaccinated to protect her unborn child* and is *now encouraging other pregnant women to get vaccinated following the Food and Drug Administration recommendations*. She luckily survived the coronavirus infection but lost her baby during her third trimester. (Source: https://www.usnews.com/news/us/articles/2021-10-19/covid-19-and-pregnancy-women-regret-not-getting-the-vaccine)

Case 6 (**October 2021**: Source – NBC: News 4, 20 Oct. 2021): A 36-year-old pregnant Caucasian woman from Nashville, Tennessee lost her battle to COVID-19. According to her mother, she had wanted to get the vaccine after having the baby, but she never got the chance to hold her baby, who was prematurely delivered and survived. (Source: https://www.wsmv.com/news/36-year-old-pregnant-dickson-county-mother-gets-covid-19-later-dies/article_74d79bd8-3210-11ec-a917-cf1a2c3eaf11.html)

Case 7 (**October 2021**: Source – ABC7, 6 Oct. 2021): A North Carolina, African American woman died after giving birth, unconscious on a ventilator. According to family members, she was hesitant to get the vaccine while being pregnant. The baby survived after being delivered via an emergency C-section and spent two weeks in NICU. (Source: https://abc7chicago.com/covid-19-pregnancy-miracle-baby-vaccine/11090078/)

Case 8 (**October 2021**: Source – Local 12 News, 22 Oct. 2021): A pregnant woman from Fort Smith, Arkansas lost her battle from COVID-19 after almost a month. She delivered her baby nearly three months before her due date. Fortunately, her baby survived and will be going home. According to the deceased woman's husband, they were both unvaccinated, but now he wishes they had seriously considered being vaccinated because that could have made a difference today. (Source: https://local12.com/news/nation-world/pregnant-woman-dies-from-covid-19-icu-nurse-makes-sure-newborn-gets-hundreds-of-gifts)

Case 9 (**January 2021**: Source – Marie Claire, 30 Jan. 2021): An African American, pregnant doctor from San Diego, California shares her story of getting the COVID-19 vaccine at 32 weeks despite being hesitant at first about getting the vaccine and was very pleased about her decision. She initially wanted to get the vaccine after giving birth, but her OB-GYN told her that she should get the vaccine. She highlights the lack of minority participants in research, and she advocates for inclusion of underrepresented populations in research studies so people of all color can feel comfortable participating in clinical studies and trials. (Source: https://www.marieclaire.com/health-fitness/a35311427/covid19-vaccine-pregnant-black-doctor-story/)

Case 10 (**October 2021**: Source – Chicago Sun-Times, 18 Oct. 2021): A seven-month pregnant African American woman from Chicago shares her story of her change of heart from being a skeptic to a proponent of the COVID-19 vaccine. She honestly states that she was skeptical despite her OB-GYN's recommendation for her to get the vaccine, and she had never wanted to get it. But reading about the severe, and sometimes deadly, cases of unvaccinated pregnant women made her think about her unborn child and helped change her mind. (Source: https://chicago.suntimes.com/covid-vaccine/2021/10/18/22714781/covid-vaccine-pregnant-cdc-women-centers-disease-control-woman-baby-health)

Case 11 (October 2021: Source – CNN.com, Atlanta, Georgia, 18 Oct. 2021): A 21-year-old, African-American, pregnant woman from Georgia was 33 weeks pregnant when she was hospitalized with COVID-19 and pneumonia. She was unvaccinated, went into labor, and delivered her baby prematurely. The mother was discharged from the hospital before she was fully recovered. She was short of breath a few days later and died from COVID-19 complications. (Source: https://www.cnn.com/2021/10/18/us/black-pregnant-moms-vaccination-rates/index.html)

Case 12 (October 2021: Source - 13 WTHR, Indianapolis, 11 Oct. 2021): A Caucasian woman who is an OB nurse tested positive for COVID-19 while she was 36 weeks pregnant. She delivered a healthy baby boy in November 2020 and the only complication she had was heavy bleeding after delivery. The mother of 3 said that if there was a vaccine available while she was pregnant, she would have taken it. Three months after having COVID-19, she got vaccinated. (Source: https://www.google.com/amp/s/www.wthr.com/amp/article/news/health/coronavirus/ob-nurse-survived-covid-19-during-pregnancy-advocates-to-get-vaccinated/531-3f583d34-f59a-4c37-a006-2798b39da0b8)

Case 13 (October 2021: Source – CBS Pittsburgh, 29 Oct. 2021): A 30-year-old Caucasian, pregnant woman from Pittsburg, Pennsylvania was 24 weeks pregnant when she had COVID-19 at the beginning of September 2021. She was hospitalized for just one night after receiving a monoclonal antibody treatment. She credits her quick recovery to getting the Pfizer vaccine in January 2021. She is now 31 weeks pregnant and is due to deliver a healthy baby girl in December 2021. (Source: https://www.google.com/amp/s/pittsburgh.cbslocal.com/2021/10/29/pregnant-woman-urgers-other-to-get-covid-19-vaccine/%3famp)

Case 14 (October 2021: Source – Business Insider, 25 Oct. 2021): A 30 year old Caucasian, pregnant woman from Kansas received both doses of Pfizer COVID-19 vaccine, plus a booster, while pregnant. She received her first dose at 9 weeks, second dose towards the end of her first trimester, and a booster shot a week before her due date. She's confident she did the right thing despite

receiving criticism from fellow moms. She is due to deliver her first baby girl soon. (Source: https://www.google.com/amp/s/www.businessinsider.com/pregnant-booster-shot-covid-vaccine-kansas-side-effects-2021-10%3famp)

Case 15 (October 2021: Source – NPR, 05 Oct. 2021): A 31-year-old Caucasian woman was 28 weeks pregnant when she was hospitalized with a very severe case COVID-19. She was intubated and spent almost a week on an extracorporeal membrane oxygenation (ECMO) machine. The doctors had to perform a C-section, even though it was nearly three months before the baby was due. Her baby was admitted into the Neonatal ICU. Both baby and mom survived, even though the road to recovery was rough. She remains unvaccinated. (Source: https://www.kuow.org/stories/this-pregnant-mom-nearly-died-from-covid-it-hasn-t-convinced-her-to-get-the-vaccine)

Case 16 (October 2021: Source – Good Morning America, 28 Oct. 2021): A 34-year-old Caucasian woman from Indiana underwent an emergency C-section on August 27, 2021 while hospitalized with COVID-19 at 33 weeks. She was placed on a ventilator and also placed on an ECMO machine. At the time of hospitalization, she was not vaccinated against COVID-19. She had had three miscarriages and *saw a risk and was advised not to get the vaccine.* Both baby and mom survived. (Source: https://www.goodmorningamerica.com/wellness/story/mom-battling-covid-19-complications-meets-newborn-son-80833100?cid=social_fb_abcn&fbclid=IwAR3bm42-CQPFHj7Nmi4n6cZ-obx1NfQfK7ngj8DKPREsdjiefNmIT46rSU0)

IV. DISCUSSION

According to the CDC, twenty-two pregnant women lost their lives in the month of August 2021, the highest number of COVID-19 related deaths in pregnant women in a single month during the pandemic (CDC-HAN, 2021). Although the absolute risk is low compared with non-pregnant symptomatic women, symptomatic pregnant women have more than a two-fold increased risk of requiring ICU admission, invasive ventilation, extracorporeal membrane oxygenation, and a 70% increased risk of death (CDC-HAN, 2021). Pregnant women with COVID-19 infections are more likely to experience preterm birth, stillbirth, or maternal death in comparison to those without infection during pregnancy (CDC, 2021d). For our study, we looked at 16 cases of pregnant women who contracted COVID-19 and the findings mirrors what the literature reports on the state of COVID-19 among pregnant women. All negative outcomes reported in the literature were also reported in our case reviews.

According to the CDC, just one-third of pregnant women were fully vaccinated before or during pregnancy as of mid-September 2021. Several factors may have contributed to the low vaccination coverage among pregnant women such as fear, unknown long-term risks, lack of provider's encouragement, lack of family encouragement, lack of self-inner motivation to vaccinate, or just being scared for their baby due to so many unanswered questions related to the vaccine. The CDC also continues to monitor reports of rare instances of myocarditis and pericarditis from mRNA vaccinations (Pfizer-BioNTech and Moderna) for COVID-19. Reported cases have occurred predominantly in male adolescents and young adults 16 years of age and older. According to the CDC, the known risks of COVID-19 illness and its related, possibly severe complications, such as long-term health problems, hospitalization, and even death, far outweigh the potential risks of having a rare adverse reaction to vaccination, including the possible risk of myocarditis or pericarditis (CDC, 2021f).

According to a recent study conducted by the CDC and Yale University, "COVID vaccinations are not linked to pre-term birth" and hence women who have received this vaccine while pregnant are not at a greater risk of delivering babies prematurely or with low-birth weight (The New York Times, 2022). This recent study is essential as researchers tries to understand health risks that the COVID vaccine may pose to pregnant women and their unborn fetus since preterm babies may experience developmental delays or other health problems. In the first phase of their research, the researchers found that vaccinated women during pregnancy did not face a higher risk of miscarriage that the unvaccinated women face. Before coming this this conclusion, they followed a group of 46,079 pregnancies that resulted in live birth, including 10,064 among women who received either one or two doses of the Pfizer or Moderna COVID vaccine during their second or third trimester, from Dec. 15, 20202 – July 22, 2021. Overall, 6.6 percent of the babies were born prematurely, before 37 weeks of pregnancy, and 8.2 percent were born small for their gestational age, weighing less than 5 pounds. However, researchers found no differences in the rates among mothers who had been vaccinated while

pregnant and those who had not. In the end, the researchers concluded that, the risk of pre-term birth, which appears to be higher when pregnant women are infected with the coronavirus are well established, with each week of gestation, since the brain develops more, and if one has COVID and have to deliver a preterm baby, that can lead to long-term growth development. Hence, this piece of news article ended their discussion by suggesting that, the benefit to vaccination during pregnancy is that women may pass on the coronavirus antibodies to their infants, helping to protect them from future illness (The New York Times, 2022).

Evidence-based research, education, counseling, and support services should be provided to pregnant women and their families in order to help them make informed decisions about COVID-19 vaccination. Although resources such as MotherToBaby are provided remotely (1-866-626-6847), success stories and research findings backed up with science should be the root of communication for those who are hesitant or scared about the vaccine (CDC, 2021d).

V. ETHICAL IMPLICATIONS AND RECOMMENDATIONS

Although there are over 50 SARS-CoV-2 candidate vaccines (in addition to those already approved around the globe) undergoing Phase II and III clinical trials with several approved for use in different countries, there still remains a scarcity for observational data from vaccine registries and limited reproductive toxicity data on maternal physiological effects of the vaccines to overrule concerns about potential or anticipated adverse effects on pregnant women, thereby leaving many pregnant women vulnerable to COVID-19. Healthcare providers face dilemmas while advising their pregnant patients (already considered high risk for COVID19 and more so if they have underlying health conditions such as obesity or diabetes) whether to get vaccinated or not because of this lack of information. Moreover, most pregnant women have been excluded from clinical research because they are categorized as *vulnerable*, raising further ethical dilemmas of justice and equity for all. By excluding pregnant women from research about the effects of the COVID-19 vaccine, there is a lack of data that is critically needed to support pregnant women if they are to make informed decisions (Habiba and Akkad 2020; Pramanick and Kanneganti et al., 2021). There is a need for an ethical framework guided by ethical principles that includes autonomy, beneficence, and nonmaleficence that can be used to help physicians and patients work together in shared decision-making. With all the mistrust and skepticism that exists today about the COVID-19 vaccines, the framework provided in this study is designed to enable shared decision-making in the clinical setting, while taking into consideration some of the common ethical implications discussed below:

1. Autonomy and Informed Consent: One of the most important principles that empowers patient decision-making ability is through the information provided to them by their providers. The information has to be truthful and adequate so the patient can make an informed decision or refusal. However, the lack of evidence-based pregnancy-specific data for COVID-19 vaccines has made it complicated for pregnant women, largely because they are not included in the research studies conducted for vaccine adverse effects. Because they fall under *vulnerable* population, and in order to protect them today, they are excluded from studies that are critically necessary for them. In the clinical setting, pregnant women should be permitted to make their own decisions about the prospects of the benefits of vaccination, for both themselves and their babies, and they should be able to weigh benefits versus risks and make this decision based on the evidence provided. The benefits of vaccines to all, whether pregnant or not, is the high level of protection against serious illness from COVID-19. It becomes difficult for pregnant women to make the decision to vaccinate due to insufficient information and no public health authority explicitly recommending the vaccine to this group (Faden, Krubiner, and Wonodi 2021). The lack of information also creates a dilemma for healthcare providers who have to consider the legal framework while balancing their ethical responsibilities to individual women when meaningful consent could be lost as research and safety information pertinent to this specific population is absent and decisions have to be rooted in heuristics (Habiba & Akkad, 2020).

2. Beneficence and Nonmaleficence: Beneficence stands for the moral obligation of care providers to benefit and help others - while nonmaleficence stands for "first do no harm." When applied to immunization, both are considered from the perspectives of the benefit and harm to the individual versus the benefit and harm on the community. Immunizations may be seen as beneficial to both the individual and the community in several ways: 1. Vaccinations can protect the public from the danger and spread of highly contagious diseases that may result in severe mortality and morbidity. 2. The disease may have the potential to cause harm to the

individual if transmitted, and immunization can prevent that. 3. Effectiveness of the immunization is proven and well established, and the burden of immunization is minimal since it does not create undue burden (Faden et al., 2021).

3. Benefits vs Risks: COVID-19 vaccination, like most vaccines, offers a dual benefit. Both mother and fetus create antibodies that have been demonstrated to provide protection to the fetus inside the mother's womb, as well as several months after birth. Studies by Sarwal et al. (2021) have noted that an effective and systemic way of achieving high coverage for pregnant women would be to include COVID-19 vaccination in the protocol for antenatal care (with an opt-out option), which would increase coverage of routine antenatal care services, while protecting mothers and their unborn babies against COVID-19. However, pharmaceutical companies have yet to add pregnant women as part of their study population in researching the effect of vaccines, as it requires extra expertise and cost and poses potential liability problems. Including pregnant women in research is critical because of the unique relationship between a woman and the fetus, and because it is needed for the pregnant population, and those who intend to become pregnant and wish to get the vaccine, since it is how one weighs the risks and benefits (Sussman, 2021). According to Rasmussen et al. (2021), the obstetrician should utilize the information from developmental and reproductive toxicology studies on animals regarding the vaccine (when available) in addition to the data that is available on the outcomes of pregnant persons inadvertently exposed to the vaccine during the clinical trials. Some prospects that need to be considered when discussing the risks and benefits are pregnant women who require admittance to an intensive care unit if infected, those who may require invasive ventilation, and those who may have higher mortality rates in comparison to non-pregnant women. The effects on the fetus are not yet completely understood. Intrauterine transmission, although rare, can occur, and data suggests that neonates are likely to be born preterm (Rasmussen et al. 2021). Other risks/complications that need to be factored in are pregnant women's underlying conditions such as diabetes, obesity, or heart disease, and whether there are dangers of acquiring infection from work environments or persons with whom they live who may have higher chances of being exposed to the virus. Timing is also another factor that needs to be taken into consideration, such as the first trimester potentially not being a good time to be vaccinated – usually the second and third trimesters are recommended for vaccines in pregnancy. Exposure to COVID-19 early in pregnancy, however, needs to be averted by following other safety precautions such as wearing masks, hand washing, and social distancing (Rasmussen et al., 2021).

4. Communication**:** In clinical settings, pregnant women may be hesitant or unwilling to accept the vaccine because of a fear of adverse effects and lack of trust or misconception. Communication is a key component in this matter, and the provider has an important part in opening up the patient's mind and creating a trusting relationship by first advancing a line of conversation. Listening to the patient's reasoning or fears - be it religious views, philosophical beliefs, or any other concerns, and respectfully addressing them in a friendly manner can assist in changing their minds. Sometimes it is the lack of knowledge that acts as a barrier to accepting the vaccine. Providers need to take the time to listen, acknowledge fears and concerns, and provide their patients with the necessary and proper scientific evidence to make the decision. Other communication strategies, such as informing them about what to expect, resources, and reporting systems (i.e., the nationwide Vaccine Adverse Event Reporting System) they can access for further information, can pave a path to a trusting relationship between patient and provider. It is recommended to keep offering the vaccine and discussing its benefits since the decision not to immunize is a reversible one (Fernbach, 2011). Healthcare providers, specifically those who are women's health care providers, should lead by example and should get themselves vaccinated (now a requirement in many locales) and encourage eligible patients to get vaccinated. They should discuss the possible side effects they faced because of the vaccine and explain how those are a body's normal reaction to antibodies against COVID-19 (ACOG, 2021). Transparent communication - disclosing both the positive and negative information about the vaccines will help maintain trust in the health authorities – even if it does not increase vaccine acceptance (Peterson et al. 2021). To help reassure patients about the safety of the vaccines, providers can inform patients about various resources such as the Centers for Disease Control's *V-Safe program*, which is an after-vaccination health checker they can participate in and gather information from other participants (CDC, 2021e).

5. Provide Appropriate Counseling and Treatment: Pregnant patients with prior severe vaccine-related side effects should be counseled, and healthcare provider should monitor them more closely if they do decide or are able to get vaccinated. For those who are interested in doing more research about severe side effects can be directed to the CDC's site about Local Reactions, Systemic Reactions, Adverse Events, and Serious Adverse Events: Pfizer-BioNTech COVID-19 Vaccine from the CDC (ACOG, 2021). Further, ACOG also recommends discussing precautions with any individual with a prior history of any immediate allergic reaction to any

other vaccine or injectable therapy and provide screening of recipients for contraindications. It is recommended that facilities providing the vaccines carry the necessary supplies to manage anaphylaxis if necessary and implement observation periods post vaccination for these patients (ACOG, 2021).

6. Vaccine Confidence: ACOG reiterates the importance of building vaccine confidence by underscoring the general safety of vaccines and highlighting the safety requirements of vaccines and ongoing monitoring of vaccines after they are made available. ACOG encourages telling patients about the life-saving importance of vaccines and routine robust immunization programs that have enabled us to stay alive longer today. ACOG further promotes talking to them about the different COVID-19 vaccine choices available, assuring them about the vaccine's efficacy, and discussing any exceedingly rare events that patients may be worried about. Many people are concerned about the rapid development of the vaccines, hence assuring them that no safety standard has been relaxed, and additionally, safety monitoring systems to track and monitor these vaccines, including real-time assessment, have been added (ACOG, 2021).

7. Follow up regularly at every step: There should be clear written guidelines for healthcare providers that have been developed and approved in their healthcare settings that support shared decision-making by providing evidence-based information that will allow patients to make informed decisions by weighing the risk and benefits of vaccination. Best practices ensure the provider ask about any barriers, challenges, and hesitancy as part of counseling and respectfully address those issues by using evidence-based practical guidance (Garg et al., 2021).

VI. LIMITATIONS

As the source of our data were news reports, the reports themselves can be biased and sensationalized. The reports may be influenced by external forces such as political loyalties and some items may be written to entertain rather than to portray facts. The lack of studies that included pregnant women in vaccine adverse reaction related studies also limited our reporting.

VII. CONCLUSION

Although vaccination is a much-debated topic, particularly in pregnant women given the lack of evidence that includes this population in studies, we acknowledge the benefits that vaccines provide to all – whether pregnant or not. Despite the fears about uncertainties regarding the vaccines, we should not forget about the benefits such vaccines have brought to us in the past starting with the Influenza Virus (also known as the Spanish Flu). There is a need for authorities and healthcare providers to take charge and recommend COVID-19 vaccines to all pregnant women in the second and third trimester using a shared decision-making model with healthcare providers. We also highlight the importance of informing patients about vaccine registries and encourage them to participate in future clinical studies if available, to benefit other pregnant women with the data needed in making informed, evidence-based decisions. More than 100,000 pregnant women reported having received a COVID-19 vaccination as of April 2021; however, a very small number have enrolled in the v-safe program, which is a smartphone-based tool provided by the CDC that allows anyone who has received the COVID-19 vaccine the ability to quickly report about any side effects utilizing text messaging and web surveys. Healthcare providers are urged to highlight the need for pregnant women to register in these registries. This again underscores the need to include pregnant women in clinical trials, as well as in public health surveillance systems involving larger numbers of pregnant women, to prepare for the next pandemic and improved maternal health outcomes of women in general (Riley 2021). As a reminder, like flu vaccines, COVID-19 vaccination does not provide absolute protection against re-infection. Re-infection with COVID-19 should be treated with the same protocols as the no vaccinated population (Emanoil et al., 2021).

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