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Awareness and Willingness to Vaccinate against COVID-19 among Pregnant Women and Reasons Influencing their Decision in Poland – a Survey-Based Study

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Abstract

Introduction: The COVID-19 pandemic has lasted for over 2 years and has resulted in more than 486 million cases and over 6 million deaths worldwide. Pregnant women are a special group of society exposed to severe or unpredictable course of infection.

Purpose of work: Assessment of awareness and willingness to vaccinate pregnant women against COVID-19 and reasons influencing this decision.

Materials and methods: The proprietary online survey addressed to women in Poland during pregnancy and women who were pregnant in the period from December 27, 2020 (introduction of the vaccine in Poland) to 20.03.2022. The study included a total of 518 respondents of reproductive age, among which 398 have a university degree and 108 have

secondary education. 376 respondents got vaccinated against COVID-19 — 120 before getting pregnant, 199 during pregnancy and 57 after giving birth.

Summary: Most of the surveyed women (321) hadn't had a positive PCR test for COVID-19 until the day of the survey, but 38% had a positive PCR test. Asked about reasons for getting vaccinated during pregnancy, most of the respondents stated that people should get vaccinated against COVID-19 in general, they got vaccinated because of the baby's health, and that they acted according to the recommendations of The Polish Society of Gynecologists and Obstetricians and the World's Health Organization. On the other hand, most of the women didn't get vaccinated because they were afraid of the side effects, there is not enough research on the topic, and they believe that the vaccination is ineffective. Additionally, 154 respondents were encouraged by the doctors to get vaccinated in opposite to 21 who were discouraged by the doctor. The majority of the respondents are aware of the great risk of COVID-19 infection during pregnancy. Therefore, they got vaccinated against COVID-19 to minimize the risks of the infection.

Keywords: COVID-19, pregnancy, vaccination, pregnant women

Introduction

Between the years 2020 and 2022, the COVID-19 pandemic has resulted in more than 486 million cases and over 6 million deaths worldwide (1). Pregnant women compose a risk group with severe or unpredictable course of infection. Given the lack of effective and targeted treatment for COVID-19, a vaccine is the only tested and recommended protection against a severe course of the disease, primarily for people with chronic diseases, but also for pregnant women as a fragile group, who are subjected to greater restrictions on treatment. Among the

proposed vaccines, it has been reported that the mRNA vaccine significantly reduces the risk of infection in pregnant women (2-6). Since its development, it has been concluded that COVID-19 mRNA vaccines are unlikely to cross the placenta, or to a minor extent, which may have a small effect on the fetus (7). Studies show that mRNA vaccines have a similar impact on pregnant and non-pregnant women in terms of immunogenicity and reactogenicity (8). It has also been observed that the organism's immune response after vaccination is significantly stronger than after a recent SARS-CoV-2 infection (8). Notably, the level of antibodies increases much faster after vaccination compared to infection and immune resistance can be transferred through the placenta or from the mother's milk, which further protects the baby from being exposed to the severe course of COVID-19 infection (2, 8).

Therefore, not getting vaccinated may have adverse consequences. It is known that COVID-19 infection can lead to many adverse events during pregnancy and after childbirth for the baby, such as vertical transmission, leading to mechanical ventilation and preterm delivery, preeclampsia, gestational diabetes, and low birth weight (9-11). Meanwhile, there are no reports of vaccination having a negative effect on pregnant women, the fetus, or the course of pregnancy (2, 12).

The purpose of our study was to investigate awareness and willingness to vaccinate against COVID-19 among Polish pregnant women.

Materials and methods

A cross-sectional, questionnaire-based study was carried out among Polish women of reproductive age (over 18 years old) to determine their awareness, willingness, and reasons for their decisions to get vaccinated against the SARS-CoV-2 virus. The self-administered survey was created online using the survey administration software Google Forms. The survey consisted of 24 closed questions, 21 of which were single-choice and 3 were multiple-choice. Additionally, two open questions were asked. The questionnaire was distributed among 31 Polish Facebook groups and also was shared on the Instagram profile of the Polish gynecologist Dr. Robert Jędra. Data was collected for almost two months (between the 1st of February 2022 and the 25th of March 2022). At the beginning of the questionnaire information was given regarding interviewees about the interviewers, the profile of the

interviewees, the way and extent of use of the received data, and the voluntary nature of participation. Anonymity and confidentiality were also provided. The recruitment criteria were Polish women who were pregnant at the time of filling out the survey or had been pregnant since December 27th, 2021 (the time of introducing the vaccine against SARS-CoV-2 infection in Poland). The minimum age of the participant was 18 years. Basic sociodemographic and economic data as well as information about the offspring and number of pregnancies was asked. There were 2 open questions concerning weight and height. Most emphases was placed on obtaining as much as possible detailed information on whether the participant got vaccinated, when she got the vaccination, and what the reasons were for getting vaccinated or not. A total of 518 women answered the questionnaire, all filled it out correctly. The purpose was to achieve a 99% confidence level and a 5% margin of error, the sample size of 292 participants was calculated. The gathered data was analyzed using descriptive statistics in Microsoft Excel. Statistical significance was detected by a p-value of < 0.05 .

Results

A total of 518 women took part in the study, all the questionnaires were filled correctly and so were used in further analysis. The sociodemographic characteristics are represented in Table 1.

Table 2 represents the history of COVID-19 disease and the status of COVID-19 vaccination. More than half of the respondents ($n=321$, 61.97%) haven't had COVID-19 infection confirmed in PCR test. Among women who have undergone COVID-19 infection ($n=197$, 38.08%), 126 (24.32%) had it during pregnancy. Most of the poles ($n=375$, 72.39%) have been vaccinated against COVID-19, most of them before pregnancy ($n=120$, 23.17%). There were 199 (38.42%) women who got vaccinated during pregnancy, the majority of them ($n=114$, 22.01%) during II trimester of pregnancy.

The univariate regression analysis shows a strong correlation between higher education and COVID-19 vaccination status. Another association is found between the and vaccination rate. The older the respondent, the greater the willingness to get vaccinated. On the other hand, the multivariate regression analysis displays a correlation between higher education and

vaccination status. No relevant relation has been found between the vaccination and place of residence or faith.

A univariate regression analysis was also performed in the group of women who were pregnant at the time of filling out the questionnaire. Significant relation has been noticed between obtaining a positive PCR – COVID-19 test during pregnancy and vaccination status. Moreover, primipara or multipara (>2 children) were more willing to get vaccinated. However, the multivariate regression analysis calculated among a group of pregnant women showed a high relationship between primipara and vaccination status.

Table 1. Sociodemographic characteristics.

Category (n=518)	Variables	Frequency	Percentage
Age	18-25	76	14.67%
	26-35	386	74.52%
	>35	56	10.81%
Education	Primary	5	0.97%
	Secondary	109	21.04%
	Higher	398	76.83%
	Professional training	6	1.16%
Place of residence	<50 tys.	168	32.43%
	50-500 tys.	168	32.43%
	>500 tys.	182	35.14%
Faith	Ateism	79	15.25%
	other	46	8.88%
	Catholic	393	75.87%
Currently pregnant	no	220	42.47%
	doesn't know	3	0.58%
	yes	295	56.95%
Miscarriage history	no	393	75.87%
	yes	125	24.13%
Number of children	0	190	36.68%
	1	199	38.42%
	2	102	19.69%
	>2	27	5.21%

Table 2. History of COVID-19 disease and vaccination against COVID-19 status.

Have you ever had a COVID-19 infection confirmed by a PCR test?	No	321	61.97%
	Yes, but not during pregnancy	126	24.32%
	Yes, during pregnancy	71	13.71%
Have you ever been vaccinated against Sars Cov-2?	no	143	27.61%
	yes	375	72.39%
	I trimester	24	4.63%
	II trimester	114	22.01%
	III trimester	61	11.78%
	After I finished breastfeeding	5	0.97%
	After childbirth	5	0.97%
	Before pregnancy	120	23.17%
	During breastfeeding	44	8.49%

The vast majority of the women were aware of the risks associated with COVID-19 disease. The most frequently chosen complications of infection were increased risk of hospitalization in the intensive care unit (n=365, 70.74%), premature birth (n=361, 69.96%), and miscarriage (n=334, 64.73%). A total of 377 (73.06%) women stated that vaccination against COVID-19 decreases the risk of severe course of infection and women's vaccination protects the baby from getting COVID-19 after birth (n=295, 57.17%). Also, more than half of the study subjects are aware of the fact that the vaccination against SARS-CoV-2 doesn't cause COVID-19 disease itself (n=324, 62.79%). Figure 3 shows the distribution of answers to the discussed questions.

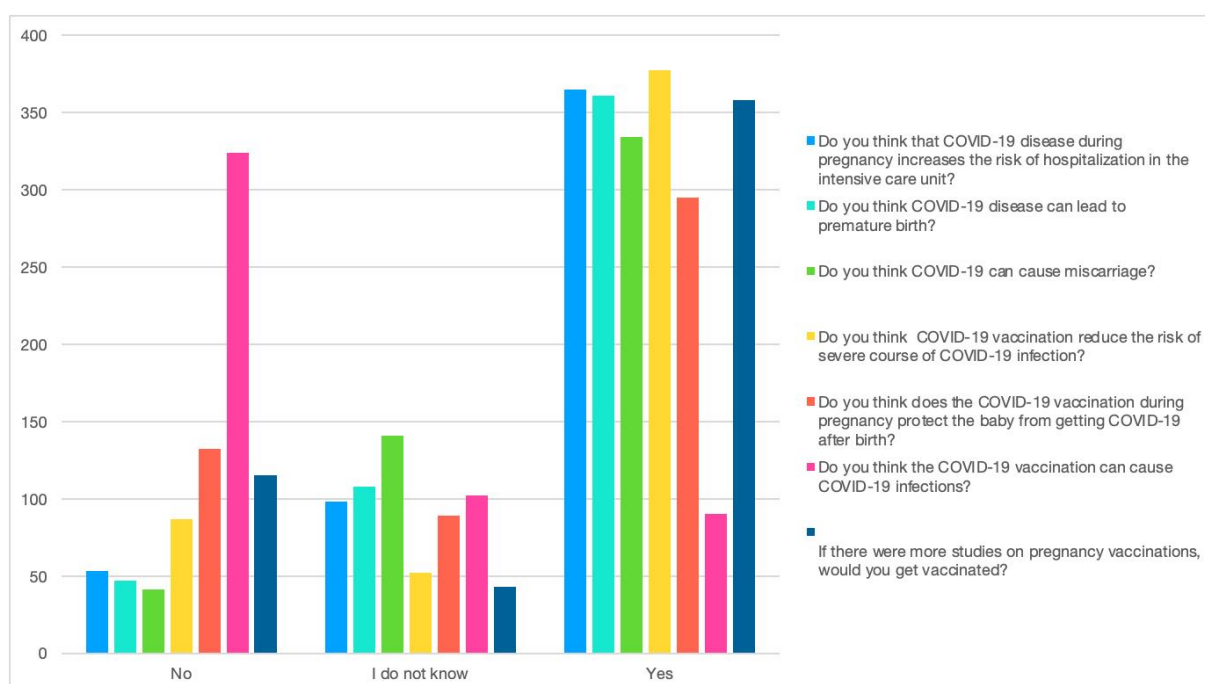


Table 3. Respondents opinion about risks associated with COVID-19 disease

Out of 518 participants in the survey, 291 got vaccinated during pregnancy. Figure 2 represents the distribution of answers to the question of the reasons for getting vaccinated against COVID-19 during pregnancy. The main reasons were that women should get vaccinated during pregnancy (n=225), for the child's health (n=196), due to recommendations of The Polish Society of Gynecologists and Obstetricians (n=170) and World Health Organization's recommendations (n=125). Around half of the women were advised by the doctor to get vaccinated (n=152). A minority of subjects were worried that after birth they would be separated from the baby (n=46) or that she wouldn't be admitted to the hospital without vaccination (n=34). Only a few of the respondents were worried about the severe course of the COVID-19 infection during pregnancy and the complications with this related.

On the other hand, a major reason for not getting vaccinated was the fear of the side effects associated with the vaccine and its negative impact on pregnancy (n=143) and the lack of enough research on pregnant women (n=128). A total of 95 women were concerned that it would cause congenital malformations. Also, a large group of subjects believed that the vaccine does not protect from getting infected by the SARS-Cov-2 virus (n=105). Some

women (n=64) indicated fear of thrombosis to be the reason for avoiding the vaccine. A total of 31 examined believe that the vaccine may cause infertility.

Figures 2 and 3 represent the distribution of answers to the questions what were the reasons for getting and not getting vaccinated against COVID-19?

The awareness of the risks associated with the vaccine among Polish women was also analyzed. Figure 4 shows the distributions of answers. 21.81% (N=113) of women consider the vaccine may increase the risk of miscarriage and congenital malformations of the fetus whereas, 105 (20.27%) respondents believe that there is a greater risk of complications of labor or (n=104, 20.08%) preterm delivery. Some (n=66, 12.74%) of them questioned an enlarged risk of fetal growth restriction is associated with. The vast majority, which was 341 (65.83) women, believe that none of the statements mentioned previously is influenced by the vaccination.

Discussion

Pregnancy is associated with a greater risk of COVID-19 infection as well as its severe course due to physiologic and immunological function changes during the course of pregnancy. In this research, a cross-sectional online study was conducted to evaluate the awareness and willingness to vaccinate against COVID-19 among Polish pregnant women.

During the COVID-19 pandemic, there was a lot of information on social media on platforms such as Facebook, Google Instagram, TikTok, and Twitter, leading to doubts about the safety of COVID-19 vaccines and their impact on fertility. Disinformation was also spread due to the lack of monitoring of social media by people who could assume the role of control to inhibit the deliberate spread of false information. The increased availability of reliable medical information about COVID-19 vaccines available through wide channels that compete with false information could overcome the plague of intentional misleading regarding COVID-19 vaccines among the population (13-16). The emergence of misinformation among younger individuals, accompanied by a lower level of education and economic status, a tendency towards right-wing and conservative ideologies, and psychological challenges, has been attributed to a rise in their beliefs. The misinformation about COVID-19 vaccines covered conspiracy theories, concerns about vaccine safety and efficacy, the need for vaccines,

morality, liberty, and humor. Safety concerns and conspiracy theories were the most common misinformation (15, 17).

After the COVID-19 vaccination, pregnant women showed a robust immune response, and vaccinations conferred protective immunity to newborns through breast milk and placental transfer. Moreover, getting a COVID-19 vaccine during pregnancy can help prevent COVID-19 hospitalizations in babies who are less than 6 months old (18). Furthermore, there are also reports that COVID-19 vaccinations can protect women against the development of SARS-CoV-2 placentitis and stillbirth (19). COVID-19 vaccination was not associated with an increase in the risk of adverse pregnancy or neonatal outcomes compared with unvaccinated pregnant people (20, 21). There is an urgent need for improved outreach to and engagement with pregnant women, especially those from racial and ethnic minority groups who might be at higher risk for severe health outcomes because of COVID-19 (22).

The global acceptance and uptake of COVID-19 vaccinations varied from 35.9% (34.3-37.5) to 86.99% (81.4-92.5) for adults. The lowest acceptance is found in Russia, Ghana, Jordan, Lebanon, and Syria. The acceptance rate experienced a global decline in 2020, subsequently recovered from December 2020 to June 2021, and then experienced a further decline in late 2021. Females, those under the age of 60, Black individuals, and those with a lower education or income were less accepted than their counterparts (23-27). The overall acceptance of the COVID-19 vaccine among pregnant women was low across the studies and was particularly low among some specific subgroups of participants. Especially, pregnant women with less than 12 years of education and multiparous women had lower COVID-19 vaccine acceptance rates. These research results have implications for the development of efficient strategies that could boost the acceptance rate of the COVID-19 vaccine among pregnant women to attain collective immunity (28-30).

The more knowledge about COVID-19 vaccines, the greater the willingness of pregnant and breastfeeding women to get vaccinated against COVID-19, even for a fee. Interestingly, the willingness to get vaccinated was also influenced by the knowledge of whether someone else or you personally had been seriously ill with COVID-19 (31). It is also critical that when caring for pregnant and breastfeeding women, medical staff should also be vaccinated against COVID-19, which protects them against the spread of COVID-19 (32).

It must be underlined that our study has a few limitations. First of all, the answers were collected online and shared only among pregnant women who were members of social media

pregnancy groups and also shared by the gynecologist Dr. Robert Jędra on his social media profile. Also, most of the respondents had higher education so it does not show the trend in the Polish women population in general. On the other hand, there were women from different regions and the distribution of places of residency was even.

The registry is committed to providing vital information regarding the safety of COVID-19 vaccination among pregnant individuals, a population that is at a higher risk of adverse outcomes from COVID-19 and was not included in pre-authorization clinical trials. The registry can help make sure that vaccines are safe for pregnant women and their babies in the future (33, 34). In systematic reviews and meta-analyses, COVID-19 vaccines are safe during pregnancy (35-37).

Due to the popular decision to exclude pregnant women from clinical trials since vaccines were first released on the market, there were no specific and available studies for a long time that could show the safety or risk for the proper course of pregnancy, the health of the fetus and the mother, which was one of the biggest concerns about the lack of knowledge about COVID-19 vaccination among pregnant women. This had a particular impact on the decision to vaccinate.

Conclusions

The majority of women in the study did get vaccinated against COVID-19 as they believed it to be safe and protect not only themselves but also their babies. The reason for getting vaccinated is the doctor's advice and also the recommendations of the Polish Society of Gynecologists and Obstetricians and the World Health Organization. It is of high importance for the recommendations to be shared by the medical societies as they are a source of reliable information. It must be underlined that there are women who believe the vaccine causes side effects such as infertility or side effects to the fetus. It is crucial to emphasize the risks of COVID-19 infection, both for the baby and mother, as well as make aware of the fact that vaccinations are the only tested protection against the severe course of the COVID-19 disease. More prospective vaccination studies among pregnant women are warranted to raise knowledge on the safety of COVID-19 mRNA vaccines among pregnant females.

DISCLOSURE

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