

Studying Complications of COVID-19 Vaccination During Pregnancy

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Original Article

Abstract

Background: Vaccination confers herd immunity through induction of memory immune responses to activate immunological defense against SARS-CoV-2 infections

Objective: the current study aimed to try to detect whether there are any complications that may occur when vaccinating against the COVID-19 during pregnancy

Methods: Pregnant women who visited Primary Health Care Centers in Kirkuk City were selected, based on the study criteria. The study sample was (374) pregnant women, (50) of them were vaccinated and (324) were not vaccinated and considered as a control group

Results: Results showed that among the total cohort of (374) pregnant women, vaccination was accepted by (59) pregnant women (13.4%). Abortion, fever, bleeding, Obesity (BMI 30 kg/m²), Hypertension, Headache, vaginal discharge and maternal tachycardia showed a significant difference between vaccinated and non-vaccinated group (OR: 1.1444, 1819.0, 2.1352, 1.7512, 2.3815, 2.6444, 1.4312 respectively)

Conclusions: It is concluded that the vaccinated pregnant women who received COVID-19 vaccination showed some complications more than those who did not receive the vaccine.

Keywords: vaccine; COVID-19; pregnant women

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1. INTRODUCTION

The severe acute respiratory syndrome-2 virus (SARS-CoV2) is a highly contagious respiratory virus that is causing the global coronavirus disease 2019 (COVID-19) pandemic [1]. The most effective approaches to stop rapid spread are global immunization campaigns and a variety of preventive measures. Clinical trials to assess the protective effectiveness of several vaccinations are progressing rapidly around the world [2]. Vaccination confers herd immunity by activating immunological defenses against SARS-CoV-2 infections by inducing memory immune responses [3-7]. The notion of mRNA vaccines has been scientifically relevant since the early twenty-first century; nonetheless, the Pfizer/BioNTech and Moderna COVID19 vaccines represent the first large-scale application of this type of vaccine [8]. The genetic code of the pathogen's relevant antigen is provided by messenger RNA vaccines. This step enables the host to build an immune response to the foreign protein that has been created [9]. Immunization against COVID-19 is recommended during pregnancy to prevent severe maternal morbidity and adverse delivery outcomes; however, vaccination coverage among pregnant women is low [10-11]. Healthy pregnant women infected with the SARS-CoV-2 virus have a higher risk of severe COVID-19 disease than non-pregnant women due to changes that occur during pregnancy [12-13]. Women immune system is temporarily lowered to prevent her immune system from damaging her growing baby, making her more susceptible to infection [14].

2. PATIENTS and METHODS

This research was carried out in Kirkuk City, Iraq, at various primary health care centers. Pregnant women who attended Kirkuk City's Primary Health Care Centers were chosen based on the study's criteria. A total of (374) pregnant women were included in the study, (50) of them were vaccinated and (324) were not. The questionnaire for data collection had been created by the researcher, which is divided into numerous sections. Characteristics of the population, which deals with the demographic characteristics of pregnant women, such as (age, monthly income, level of education, residential area, type of vaccine, Trimester at vaccination and number of vaccinations).

3. RESULTS

Socio-demographics characteristics

The findings of current study demonstrated that the highest age was 26-30 years in vaccinated and non-vaccinated groups (42%, 39.8% respectively). Concerning monthly income, (46%) of the vaccinated women had barely sufficient income in comparison to the non-vaccinated group who showed a percentage of (55.3%). The level of education of institute and college graduate in vaccinated and non-vaccinated groups was about (32%, 33.3%) respectively. The urban residential area of vaccinated and non-vaccinated groups was 70%, 62% respectively. Concerning the vaccine type, vaccinated pregnant women received three types of vaccines which included: Sinopharm (38%), Pfizer-BioNTech (46%) and AstraZeneca (16%). The results of current study also showed that the first trimester (58%) of pregnancy is the most period of pregnancy in which vaccine is received, and it is found that the number of doses is as the following: first dose (82%), and the second is (18%) as shown in (**Table 1**).

Reproductive characteristics

The findings of the current study showed that the highest duration of marriage was (3-5) years in vaccinated and non-vaccinated groups (48%, 49.1% respectively). Menstruation in vaccinated group was irregular (74%). The history of abortion in vaccinated group was approximately (38%). The percentages of hereditary disease in vaccinated and non-vaccinated groups were (36%, 57.1%) respectively as shown in (**Table 2**).

Factors associated with vaccination

Among the total cohort of (374) pregnant women, vaccination was accepted by (50) pregnant women (13.4%). Abortion showed significant difference between vaccinated and non-vaccinated group (OR: 1.14). Fever showed significant difference between vaccinated and non-vaccinated group (OR: 227.4). Bleeding showed significant difference between vaccinated and non-vaccinated group (OR: 2.14). Obesity (BMI \geq 30 kg/m²) showed significant difference between vaccinated and non-vaccinated group (OR: 1.75). Hypertension demonstrated a significant difference between vaccinated and non-vaccinated group (OR: 2.38). Headache showed a significant difference between the two groups (OR: 2.64). Vaginal discharge also demonstrated a significant difference between the two groups (OR: 1.43). Maternal tachycardia had a non-significant difference between vaccinated and non-vaccinated group

(OR: 1.12). All of these findings are demonstrated in (**Table 3**)

Table 1. studied groups according to social demographics characteristics

Variable		Vaccinated (n=50)		Non- vaccinated (n=324)	
		No.	%	No.	%
Age groups (year)	< 20	5	10.0	38	11.7
	20-25	6	12.0	41	12.7
	26- 30	21	42.0	129	39.8
	31- 35	13	26.0	87	26.9
	>35	5	10.0	19	5.9
Monthly income	Insufficient	18	36.0	97	29.9
	Barely sufficient	23	46.0	179	55.3
	Sufficient	9	18.0	48	14.8
Level of education	Read & write	6	12.0	22	6.8
	Primary	8	16.0	47	14.5
	Intermediate	11	22.0	64	19.8
	Secondary	9	18.0	83	25.6
	Institute and college	16	32.0	108	33.3
Residential area	Urban	35	70.0	201	62.0
	Rural	15	30.0	123	38.0
Vaccine type	Sinopharm	19	38.0	-	-
	Pfizer-BioNTech	23	46.0	-	-
	AstraZeneca	8	16.0	-	-
Trimester at vaccination	First	29	58.0	-	-
	Second	14	28.0	-	-
	Third	7	14.0	-	-
Number of vaccination	One	41	82.0	-	-
	Two	9	18.0	-	-

Table 2. studied groups according to reproductive characteristics

Variables		Vaccinated (n=50)		Non- vaccinated (n=324)	
		No.	%	No.	%
Duration of marriage (year)	1-3	5	10.0	39	12
	3-5	24	48.0	159	49.1
	5-7	12	24.0	72	22.2
	<7	9	18.0	54	16.7
Menstruation	Irregular	37	74.0	256	79
	Regular	13	26.0	68	21
History of abortion	Non	31	62.0	211	65.1
	Yes	19	38.0	113	34.9
Hereditary disease	Non	32	64.0	185	57.1
	Yes	18	36.0	139	42.9

Table 3. Factors associated with vaccination during pregnancy period

Factors	Vaccinated group (n=50)	Non-vaccinated (n=324)	OR	P value
Abortion	19	113	1.14	<0.001
Fever	34	3	227.40	0.013
Bleeding	28	121	2.14	<0.001
Obesity (BMI \geq 30 kg/m ²)	19	84	1.75	0.003
Hypertension	39	183	2.38	<0.001
Headache	41	205	2.64	<0.001
Vaginal discharge	27	146	1.43	<0.001
Maternal tachycardia	13	37	1.12	0.239

OR: odds ratio

4. DISCUSSION

The COVID-19 vaccination was not linked to an increased risk of preterm delivery or SGA at birth during pregnancy. The absolute risk of severe morbidity associated with COVID-19 during pregnancy is low; however, compared to non-pregnant women with symptomatic infections, women with symptomatic COVID-19 during pregnancy have a more than twofold increased risk of intensive care unit admission, invasive ventilation, and extracorporeal membrane oxygenation, as well as a 70% increased risk of death [15,16]. COVID-19 infection is dangerous to the health of the mother, fetus, and newborn. While pregnancy does not appear to increase the risk of contracting SARS-CoV-2, pregnant women may be in situations at work (e.g., health-care workers, front-line workers, etc.) or in the community (e.g., caregivers, Indigenous communities, outbreak settings, etc.) where infection is a significant risk. Some pregnant women are at a higher risk of severe COVID-related morbidity due to maternal age, underlying comorbidities, or social marginalization. [17]. Similar patterns of reporting for common minor side events were seen in a report 11 on the first 35 000 pregnant women who received a COVID-19 vaccination. Non-pregnant women reported systemic symptoms like fever more frequently, but pregnant women reported nausea and vomiting more frequently after the second dosage of the Pfizer-BioNTech and Moderna vaccines [18]. Smaller observational studies have found similar results, with no significant difference in post-vaccination symptoms between pregnant and non-pregnant women and a lower prevalence of

systemic symptoms like fever in pregnant women [19-20]. According to preliminary findings in the [18] investigation, there are no safety issues with regard to maternal and neonatal hazards. The most common pregnancy-related adverse event was spontaneous miscarriage (104/827, 12.6 percent – in line with known background rates), with 92.3 percent of miscarriages happening in the first trimester, which matches the findings of this study. Preterm delivery (9.4%), small-for-gestational-age (3.2%), and significant congenital abnormalities (2.2%) were the most common unfavorable outcomes among (724) livebirths in the study by [18], all of which were consistent with reported statistics. In the first trimester or during the periconception phase, none of the mothers whose kids were born with congenital abnormalities had received the COVID-19 vaccine. The COVID-19 vaccination was not linked to an increased risk of preterm delivery or SGA at birth during pregnancy. The absolute risk of severe morbidity associated with COVID-19 during pregnancy is low; however, compared to non-pregnant women with symptomatic infections, women with symptomatic COVID-19 during pregnancy have a more than twofold increased risk of intensive care unit admission, invasive ventilation, and extracorporeal membrane oxygenation, as well as a 70% increased risk of death [15,16]. COVID-19 infection is dangerous to the health of the mother, fetus, and newborn. While pregnancy does not appear to increase the risk of contracting SARS-CoV-2, pregnant women may be in situations at work (e.g., health-care workers, front-line workers, etc.) or in the community (e.g., caregivers, Indigenous communities, outbreak settings, etc.) where infection is a significant risk. Some pregnant women are at a higher risk of severe COVID-related morbidity due to maternal age, underlying comorbidities, or social marginalization. [17]. Similar patterns of reporting for common minor side events were seen in a report 11 on the first 35 000 pregnant women who received a COVID-19 vaccination. Non-pregnant women reported systemic symptoms like fever more frequently, but pregnant women reported nausea and vomiting more frequently after the second dosage of the Pfizer-BioNTech and Moderna vaccines [18]. Smaller observational studies have found similar results, with no significant difference in post-vaccination symptoms between pregnant and non-pregnant women and a lower prevalence of systemic symptoms like fever in pregnant women [19-20]. According to preliminary findings in the [18] investigation, there are no safety issues with regard to maternal and neonatal hazards. The most common pregnancy-related adverse event

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5. CONCLUSIONS

It is concluded that the vaccinated pregnant women showed some complications more than those did not receive the vaccine. However, the reason for these results may be due to the small number of vaccinated women during pregnancy in the current study compared to the number of the non-vaccinated group.

Ethical Clearance:

Ethical issues were taken from the research ethics committee. Informed consent was obtained from each participant. Data collection was in accordance with the World Medical Association (WMA) declaration of Helsinki for the Ethical Principles for Medical Research Involving Human Subjects, 2013 and all information and privacy of participants were kept confidentially.

Conflict of interest: Authors declared none

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