Barriers Of COVID19 Vaccination in Pregnant Women Attending Primary Health Care Centers in Baghdad 2022

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Abstract:

Background: Developing a vaccine is considered a key strategy to end the COVID19 pandemic, but require high coverage rates to be successful. Vaccine barriers poses serious challenges for achieving coverage rates to be successful. The pregnant women are considered as high-risk group for infection. Increased risk of serious illness and pregnancy complications make vaccination for this group of population more urgent than ever.

Objectives: The objectives were to identify the barriers of COVID19 vaccination among pregnant females, find any variables related to the vaccination status, find the association between intended pregnancy and vaccination status, and the association between using of other protective measures and vaccination status.

Methodology: A cross sectional study design used; data were conducted during a period of four months from 1st of March 2022 to 30th of June 2022. A convenient sampling technique used and data were collected from 10 Primary Health Care Centers in Baghdad. Interviewing questionnaire was used for data collection.

Results: Among 500 unvaccinated pregnant ladies, there were many barriers related to the vaccination, the major concern about vaccine safety to their babies (79.2%) and bodies (43.6%), the other barrier was lack of knowledge about vaccine safety in pregnancy (67.4%). Age, gravidity, trimester, gestational age, intended pregnancy were most variables related to vaccination status.

Conclusion: Harming the baby was strongest barrier to vaccination in group of pregnant ladies, many variables affect vaccination status, intended pregnancy increases the level of barriers to vaccination.

Key words: Covid 19, Vaccine, Barriers of vaccination, Pregnancy.

Introduction:

The COVID19 is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a new type of enveloped RNA coronavirus, which communicated from one individual to the other via airborne and direct contact and caused epidemics started in Wuhan city in China, then the disease become pandemic.[1] Vaccination considered as most convenient, effective strategy for prevention and avoid complications, and developing a vaccine was a key strategy to end the pandemic.[2] The development of COVID19 vaccine was occurring at unprecedented speed, but require high coverage rates to be successful.[3]

COVID19 vaccination causes a more predictable immune response than infection with virus that cause COVID19, and can provide protection for people who previously had COVID19. Getting vaccine is a safer method to build protection, high vaccination coverage in a population reduces the spread of the infection and assist in preventing new variants from emerging.[4] High vaccination rates are significant in achieving herd immunity to decrease the transmission of COVID-19 and decrease risk of infection among the general population.[5]

The pregnant women are the most vulnerable and liable group for infection and considered as high-risk group for COVID19 infection. The pregnant women infected with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) may be asymptomatic or symptomatic, those who are symptomatic to be at increased risk for developing severe sequel of coronavirus disease 2019 (COVID19) compared with non-pregnant females in the reproductive-age, they also may be at increased risk for developing some pregnancy complications like preterm birth, while in utero transmission is uncommon, but rates of miscarriages and congenital anomalies do not affected by COVID-19.[6]

Regarding high-risk pregnancy in Iraq, Ministry of Health (MoH) reports that about 40% of pregnant women having high risk pregnancy, anemia during pregnancy represent 36%, previous abortions 16.5%, previous caesarean section 14%, hypertension 2%, and diabetes mellitus 1%, make this group of people important group in the population.[7]

Vaccine was safe for pregnant women and recommended by center of disease control (CDC), all people 5 years and older to get vaccinated and also recommend that all pregnant women and who are planning to become pregnant and those with breast feeding to get the vaccine. CDC encourages vaccination early in pregnancy and did not find any increase rate of miscarriage or birth defects or cause infertility in men or women. Number of pregnant women infected with COVID19 rise, this increased in number of pregnant infected with highly contagious variants, and increased risk of serious

illness and pregnancy complication make the vaccination for this group of population more urgent than ever. [8]

For pregnant and breastfeeding women, Pfizer-BioNTech COVID19 vaccines (mRNA COVID-19 vaccines) are preferred. Getting a mRNA COVID19 vaccine during pregnancy reduces the risk of severe illness from COVID19 for people who are pregnant, the body build antibodies against corona virus, these antibodies can cross to the baby's umbilical cord blood and this means COVID19 vaccination during pregnancy can help protect babies against COVID19. A recent small study found that at 6 months old babies, the majority (57%) of infants born to pregnant women who were vaccinated during pregnancy had detectable antibodies against COVID19, compared to 8% of infants born to pregnant women who had COVID19 during pregnancy. CDC declared completing a two-doses of vaccine series during pregnancy can help protect babies younger than 6 months old from hospitalization due to COVID19. [9]

Vaccination can occur at any trimester, and emphasis should be on vaccine receipt as soon as possible to maximize maternal and fetal health. [10] On 25th of August 2021 the Iraqi Ministry of Health declared that the pregnant women can use mRNA Pfizer vaccine at the completion of fourth month of pregnancy. [11]

Vaccine barriers poses serious challenges for achieving coverage for population immunity. From previous infectious disease outbreaks and pandemics has identified a large list of barriers that can interfere with vaccination, resulting in worsened disease control. Included: Individual beliefs or perceptions, low risk of contracting the disease or its severity, lack of trust toward vaccines, misinformation that creates fear and uncertainty around vaccines, misconception due to lack of knowledge about vaccine and vaccine recommendations and adverse effect, fear of being infected, other factors: cultural differences and distrust in the government, make serious barriers to the spread of the vaccine. Women planning to pregnancy or currently pregnant have concerns regarding the safety of the COVID-19 vaccine, which remains a barrier to vaccination. On top of them are miscarriages, birth defects, bad pregnancy outcomes, risk of infertility, change of menstrual cycles, and lack of awareness persists as an impediment to vaccination program. [12,13,14]

Healthcare providers are long-standing essential partners in the recommendation and safe administration of vaccines, physicians, nurses, and other health care professionals should increase their efforts to build honest and respectful relationships with the patient, especially when express concerns about vaccine safety or have misconceptions about the benefits and risks of vaccinations. [15] The objectives of current study are:

1. Identify the barriers of COVID19 vaccination among pregnant females.
2. To find out any variables related to vaccination status.
3. To find any association between intended pregnancy and vaccination status.
4. To find association of barriers with other protective measures: Face mask, hand washing and hygiene, social distances.

Subjects and Methods :

A cross sectional study with analytic element was conducted at 10 Primary Health Care Centers, five at Al-Karkh Directorate and five at Al-Rusafa Directorate. The centers were selected based on availability of COVID19 vaccine and the services were provided to the clients during their pregnancy. A convenient sampling technique was used in selection, data were collected by direct interviewing pregnant ladies and answering a preformed questionnaire, and nearly about 50 pregnant ladies from each primary health care center. The data collected during the period of four months from 1st of March 2022 to 30th of June 2022.

The study included all unvaccinated pregnant women regardless their age, gestational age, parity, previous status of COVID19 infection. The study excluded all vaccinated pregnant women even receiving single dose of vaccine.

A especially prepared questionnaire was applied based on the research (COVID19 vaccine acceptance in pregnant women) with some modifications, [16] the questionnaire was translated to Arabic, the translation was reviewed and validated by authorized English translator, and both English and Arabic versions approved by five seniors in their respective field (two community medicine, two family medicine, one internal medicine).

The questionnaire included three parts:

First part: socio-demographic information of participants include:

- Age of participant (< 19 year, 19 – 35 year, > 35 year).
- Socioeconomic status calculated according to the research (Developing a socioeconomic index for health research in Iraq). [17]

SES=Education + Occupation + House ownership *0.5 + Car ownership * 0.1 + (age -20)/100 – Retired /Unemployed/Deceased.

Scoring of SES: Low less than 4, Middle 4-9, High more than 9.

Second part:

included medical history of pregnant females:

- Gestational age (first trimester, second trimester, third trimester).
- Gravidity (gravida 1, gravida 2-4, gravida ≥ 5).
- Parity (para 1, para 2-4, multipara ≥ 5).
- High risk pregnancy: women or her fetus face a chance of problem either due to factors in the pregnancy itself or due to preexisting maternal

medical conditions such as (diabetes mellitus, hypertension, previous history of abortion, anemia, asthma, others: hyperemesis gravidarum and peptic ulcers) which based on history presented in the case record of the participants.

- Intended pregnancy.
- Previous history of COVID19 infection (during the last year) documented by PCR, or history of infection in the current pregnancy.
- History of husband COVID19 vaccination status: because of the close relationship, it may affect her decision about vaccination.
- Tetanus vaccination status (two types of vaccine used TT and Td).
- Care about hand hygiene after touching common surfaces, and after comes back home from common places.
- Wearing face mask (surgical mask), data collected in period of post COVID19 era, which is the most common type of face mask used.
- Social distances: keep at least arm's length distance from others and avoid gatherings.[30]

Third part: included questions prepared to measure the barriers that prevent the participants from getting COVID19 vaccine, this part contain 10 questions, each question was answered by Yes or No, and these questions divided in to four main domains, regarding **safety domain** which include three questions: vaccine will harm my baby, vaccine will harm my body, lack of data about vaccine safety in pregnancy, regarding **effectiveness domain** which include two questions: vaccine may cause COVID19 infection, believes about vaccine will cause long term genetic effect and infertility, the third part regarding **personal issue** which include four questions: afraid of injection, COVID19 not serious disease, have low risk of infection, lack of trust regarding vaccine source and storage and the last domain regarding **logistic** barriers include: vaccine not available in health care centers.

Scoring of barriers:

Regarding 10 barriers in the questioner, if the respondent think that the mentioned barriers prevent her from taking the vaccine, respond by Yes which equal to one point. If having > 8 points out of 10 points considered as having high level of barriers against COVID19 vaccination, while if she summate 4-7 points considered as having moderate level of barriers and if having 1-3 points she was considered as having low level of barriers against COVID19 vaccination, this score was validated by Scientific Research Committee

Ethical considerations:
1- The researcher proposal was fully discussed and approved by the ethical and Scientific Comity of Iraqi Board of Family Medicine.
2- The agreement of health authority in included primary health care centers were taken before starting data collection.
3- Verbal consent was taken from each participant after full explanation of aim of the study and insuring her about the confidentiality of collecting data which wouldn't be used for any purpose other than current study and the collected data would be anonymous.

Analysis of data was carried out using the available statistical package of SPSS-28 (Statistical Packages for Social Sciences- version 28). Data were presented in simple measures of frequency, percentage, mean, standard deviation. The significance of difference of different percentages (qualitative data) were tested using Pearson Chi-square test (χ^2-test) with application Fisher Exact test whenever applicable. Statistical significance was considered whenever the P value was equal or less than 0.05.

Results:

The current study was applied to 500 pregnant unvaccinated women, the majority of them (75.4%) aged between 19-35 year. Most of them (53.2%) low socioeconomic status. About (63.2%) of pregnancies in this study were intended. 29.4% of studied women were primigravida. More than half of them (59.6%) were Para 2-4. 14.2% of interviewed women in this study were in the first trimester, as shown in table 1.

Table (1): Distribution of studied cases according to socio-obstetrical variable

		No.	%
Age	<19 Year	75	15.0
	19-35year	377	75.4
	>35 year	48	9.6
Socioeconomic status	Low	266	53.2
	Middle	168	33.6
	High	66	13.2
Intended pregnancy	Yes	316	63.2
	No	184	36.8
Gravidity	Primi	147	29.4
	2-4	257	51.4
	≥5	96	19.2
Parity	Null parity	161	32.2
	2-4	298	59.6
	≥5	41	8.2
Gestational age	1st trimester	71	14.2
	2nd trimester	255	51.0
	3rd trimester	174	34.8

More than half of pregnant women have low risk pregnancy 53%, while 47% of them considered as high-risk pregnancy which included (diabetes mellitus 5.4%, hypertension 7.8%, previous abortion 21.8%, anemia 16.8%, asthma 2.2%, others 1.8%), as shown in figure (**1**)
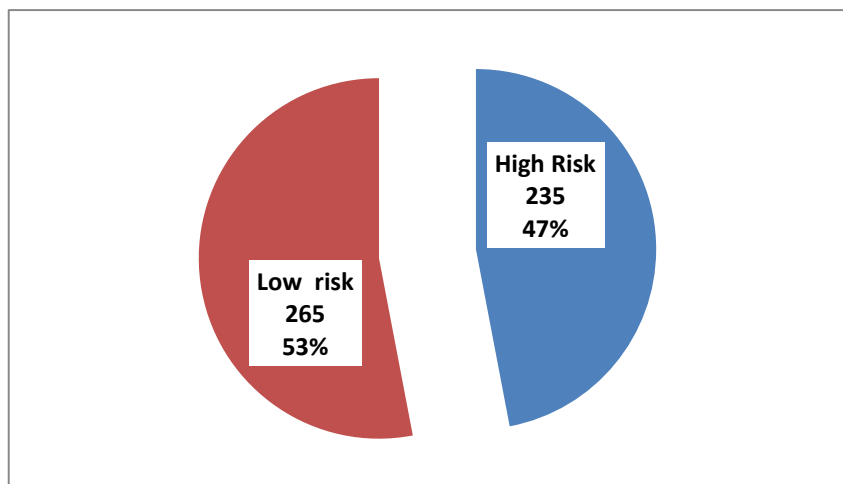

Figure (1): Distribution of studied ladies according to risky pregnancy.

About (38.4%) of studied women had previous COVID19 infection, (12.4%) of them infected in this pregnancy. Out of expect nearly half of them (49.2%) their husband was vaccinated against COVID19, and (75%) of studied ladies followed the tetanus vaccination schedule, as shown in table (**2**). About (42.8%) of ladies care about their hand hygiene and 50.4% of them wear face mask in crowded spaces and 41.6% concern about social distances, as shown in table (**3**).

Table (2): Distribution of studied cases according to infectious history

		No.	%
Previous COVID19 infection (during the last year)	Yes	192	38.4
	No	308	61.6
COVID 19 infection in this pregnancy	Yes	62	12.4
	No	438	87.6
Husband was vaccinated	Yes	246	49.2
	No	254	50.8
Tetanus vaccine	Yes	375	75.0
	No	125	25.0

Table (3): Distribution of studied cases according to use other protective measures

		No.	%
Care of hand hygiene	Yes	214	42.8
	No	286	57.2
Wearing mask	Yes	252	50.4
	No	248	49.6
Social distance	Yes	208	41.6
	No	292	58.4

Regarding the distribution of studied cases according to individual questions in each studied domain, for safety domain, 79.2% of included women stated that the vaccine will harm their babies, 67.4% said that there is no adequate data regarding vaccine safety in the pregnancy and 43.6% of them think that the vaccine will harm their bodies. Regarding effectiveness domain, 36.6% of interviewed women said that vaccine will cause COVID19 infection, while 33.2% believed that vaccine can cause infertility and long-term genetic effect. Regarding personal concern domain, 51.4% think that they have low risk of COVID19 infection, 34.4% had insufficient trust in vaccine source and storage and 29% believed COVID19 is not a serious disease, while 24.8% were found to be afraid of injection. Finally, 1.2% stated that the vaccine is not available in health centers as shown in Fig 2.
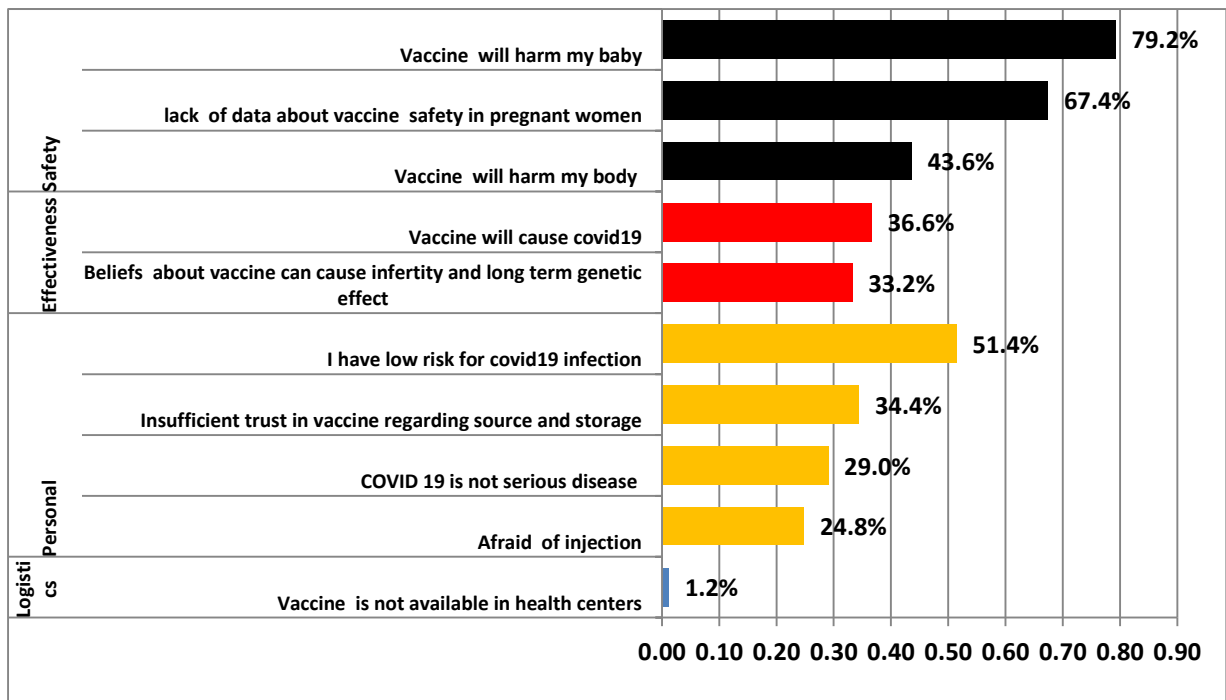
Figure (2): Distribution of studied cases according to individual questions in each domain.

Surprisingly, 61% of participant women had low level of barriers to vaccination against COVID19, while 26% of them had intermediate level of barriers and just 13% of them had high level of barriers against vaccination, as shown in figure (**3**).
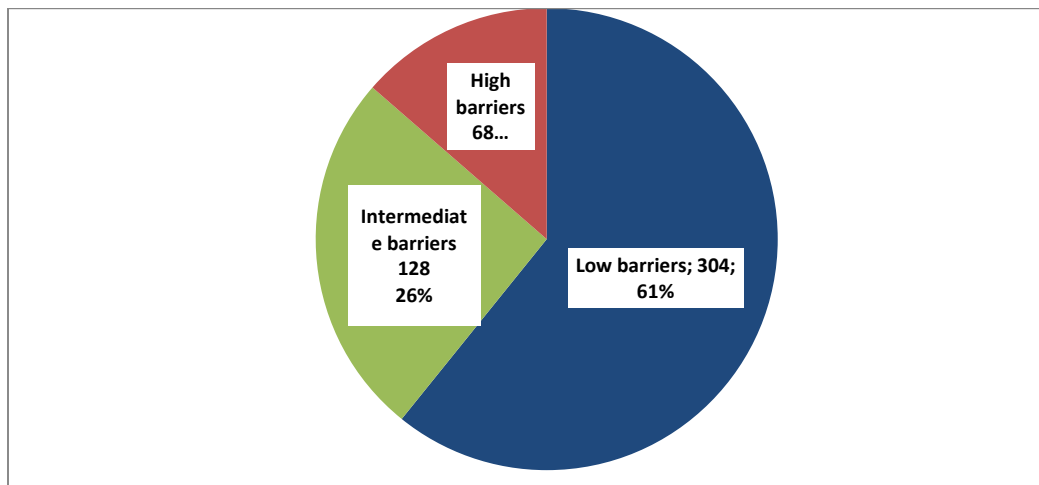

Figure (3): Distribution of studied cases according to barriers level.

As expected there was significant association between the age and level of barriers to vaccination where women older than 35 year had low level of barriers than other age groups, (P-value= 0.007), the another highly significant association between intended pregnancy and level of barriers to vaccination where women with no history of intended pregnancy had high level of barriers to vaccination, (P-value = 0.001), women with lower gravidity had higher barrier levels, (P- value= 0.048), and women in the second trimester of pregnancy showed high barrier levels, (P- value= 0.024), as shown in table (**4**).

We found that there was significant association between history of previous COVID19 infection in this pregnancy (P-value =0.026) or during the last year (P-value= 0.002) and level of barriers against COVID19 vaccination, which was low level of barriers against COVID19 vaccination, the studied ladies who their husband vaccinated against COVID19 had lower level of vaccination barriers, (P- value= 0.007), women who follow tetanus vaccination schedule had low level of COVID19 vaccination barriers, (P- value= 0.001), as shown in table (5). Women who care about hand hygiene had higher level of vaccination barriers, (P-value= 0.01), while women who wear face mask showed low level of vaccination barrier, (P- value= 0.007). as shown in table (6).

Table (4): Association between socio-obstetrical variables and barrier level

		High		Intermediate		Low		P value
		N	%	N	%	N	%	
Age	<19 Year	11	14.7	26	34.7	38	50.7	0.007
	19-35year	54	14.3	97	25.7	226	59.9	
	>35 year	3	6.3	5	10.4	40	83.3	
Socio-economic status	Low	153	57.5	73	27.4	40	15.0	0.245
	Middle	103	61.3	44	26.2	21	12.5	
	High	48	72.7	11	16.7	7	10.6	
Gravidity	Primi grvaida	26	17.7	46	31.3	75	51.0	0.048
	2-4	32	12.5	56	21.8	169	65.8	
	≥5	10	10.4	26	27.1	60	62.5	
Parity	Nulliparity	26	16.1	49	30.4	86	53.4	0.092
	2-4	39	13.1	72	24.2	187	62.8	
	≥5	3	7.3	7	17.1	31	75.6	
Intended pregnancy	Yes	40	12.7	99	31.3	177	56.0	0.001
	No	28	15.2	29	15.8	127	69.0	
Gestational age	1st trimester	9	12.7	21	29.6	41	57.7	0.024
	2nd trimester	46	18.0	64	25.1	145	56.9	
	3rd trimester	13	7.5	43	24.7	118	67.8	
High risk pregnancy	Risk	25	10.6	57	24.3	153	65.1	0.104
	No risk	43	16.2	71	26.8	151	57.0	

Table (5): Association between infectious and vaccination history and barriers level

		High		Intermediate		Low		P value
		No.	%	No.	%	No.	%	
Have risk of covid19 infection	Yes	9	9.4	27	28.1	60	62.5	0.384
	No	59	14.6	101	25.0	244	60.4	
Previous COVID 19 infection (during last year)	Yes	13	6.8	53	27.6	126	65.6	0.002
	No	55	17.9	75	24.4	178	57.8	
COVID 19 in this pregnancy	Yes	2	3.2	15	24.2	45	72.6	0.026
	No	66	15.1	113	25.8	259	59.1	
Husband was vaccinated	Yes	22	8.9	62	25.2	162	65.9	0.007
	No	46	18.1	66	26.0	142	55.9	
Tetanus vaccine	Yes	36	9.6	94	25.1	245	65.3	0.001
	No	32	25.6	34	27.2	59	47.2	

Table (6): Association between use of other protective measures and barriers level according to Chi square test

		High		Intermediate		Low		P value
		No.	%	No.	%	No.	%	
Care of hand hygiene	Yes	33	15.4	67	31.3	114	53.3	0.01
	No	35	12.2	61	21.3	190	66.4	
wearing mask	Yes	23	9.1	73	29.0	156	61.9	0.007
	No	45	18.1	55	22.2	148	59.7	
Social distance	Yes	30	14.4	53	25.5	125	60.1	0.901
	No	38	13.0	75	25.7	179	61.3	

Discussion

The current study reported level of barriers of COVID19 vaccination in a sample of pregnant unvaccinated women. More than one third of pregnant females have high and intermediate level of barriers to vaccination, the main concern about vaccine safety to their babies and bodies regarding vaccination, the other major concern in this group of pregnant ladies was lack of data about vaccine safety in pregnancy, which was similar result to the finding of research in Turkey [16]. Also, same outcomes in another study done by Liyuan Tao et al., in China which found that the main factor of refusing any immunization during pregnancy, worrying about side effect and followed by safety of COVID19 vaccine for pregnant women and unborn fetus was not satisfactory. [18] And also similar to the result of Walid Al-Qerem et al. research done among Iraqi general population which found most reasons for refusing vaccination were concern about vaccine safety and its side effects. [19]

Current review showing women younger than 19 years of age having high and intermediate level of barriers toward vaccination, this finding similar to the study done in the United Kingdom by Helen Skirrow et al. Which showed the women aged less than 25 years more likely to refuse COVID19

This study surprisingly found that there was no significant association with the socioeconomic status and COVID19 vaccination barriers level, as same as the result in the study done in Thailand, this is due to pregnant ladies and their spouses saw that it was responsibility of the public authority to give free immunization to all resident. Our study found that husbands of pregnant ladies who got COVID19 vaccine have lower level of barriers to vaccination, while in Thailand study found no significant impact on increasing or decreasing rate of COVID19 vaccine acceptance among pregnant women, this may be due to their experienced vaccine side effect. [21]

Participants in their third trimester of pregnancy had lower level of barriers against vaccination, while in Goncu et al. Study found the participants in their first trimester expressed greater interest in receiving the COVID19 vaccination compared with participants in their second and third trimesters. [16] which may be due to depression, anxiety and psychological distress were common symptoms during the first trimester of pregnancy. [22]   Out of expect, in the current study found women who were not intended to be pregnant had low level of barriers regarding vaccination, similar to the result in another study done by Mohammed Samannodi in Saudi Arabia, found pregnant ladies and those wanting to get pregnant had higher obstructions in regards to taking the vaccine in contrast with ladies who are not pregnant or not intending to be pregnant. One of the most important factors that increase barriers to receive vaccination are issues of trust and hearing or finding out about adverse occasions from various sources. [23]

Women who have previous history of COVID19 infection either in this pregnancy or not had lower level of barriers against COVID19 vaccination, this result was similar to the study done by Shareef et al., in Iraq done on general population which was found patients with a past clinical history of COVID19 infection were accepting the vaccine at a significantly higher rate than patients without a history of infection.[24] Because individuals who already had COVID19 have greater protection against reinfection and severe COVID19 and vaccination was associated with decrease in trouble and risks of infection, hospitalization, and even death.[25]

With respect to investigation, we discovered that the women who follow the tetanus vaccination schedule have low level of barriers to COVID19 vaccination, this outcome like the outcome in the investigation of Goncu et al. in Turkey, this is due

vaccine wither pregnant or not pregnant, [20] which was due to lack of information and was more reported in young women. While in the review done by Liyuan Tao et al in China, the more youthful pregnant ladies have more acknowledgment to inoculation against COVID19. [18]
to tetanus toxoid administration during pregnancy is a part of the health policy in Iraq and Turkey, and the program firmly followed by obstetrician and family physicians in health care centers, and the pregnant women understand the positive effect of tetanus vaccination on maternal and neonatal wellbeing through preventing serious infection. [16]

This study found women who care about hand hygiene had higher level of barriers against vaccination, while who care about wearing face mask had lower level of barriers, and female who care about social distance no association with barriers to vaccine, in the United States, the fact that even though COVID19 vaccines are becoming more available, safety measures (e.g., face masks, personal hygiene, and social distancing) are still of importance in protecting personal and public health against COVID19.[26,27] The findings from the current study specified the following conclusions:

1. Harming the baby was strongest barrier to vaccination (79.2%), followed by lack of knowledge about safety of vaccine in pregnancy about (67.4%), then vaccine may harm my body about (43.6%), and vaccine may cause infertility and long-term genetic effects about (33.2%), which make the safety and effectiveness domains regarding vaccination most barrier in the group of pregnant females.
2. young age females, in low socioeconomic status, primi, in the first trimester, no previous history of infection, her husband not vaccinated, not vaccinated with tetanus vaccine, all increases level of barriers to vaccination.
3. Intended pregnancy increases the level of barriers to COVID19 vaccination.
4. Women who care about hand hygiene had higher level of vaccination barriers, while women who wear face mask showed low level of vaccination barrier, while there was no significant association between social distances and barriers to immunization.

Recommendations:
1. Increasing knowledge and education about safety of vaccine in pregnancy through media sources like television, radio, papers, social media, posters.
2. Awareness raising group workshops in the primary health care centers about vaccine benefit for the people who refuse vaccination.
3. In the future, doing further prospective studies to evaluate the level of barriers regarding COVID19 vaccination in pregnant females and their future vaccination status

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