Acceptance of COVID-19 Vaccine among Pregnant Women: A Comparative Study

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Abstract

Background: COVID-19 vaccination is a critical intervention to restrict spread and reduce adverse outcomes of the pandemic especially among vulnerable population including pregnant women. Understanding the COVID-19 vaccine acceptance is critical to manage reasons of refusal and increase vaccine uptake. **Aim:** to compare the acceptance of COVID -19 vaccine among Egyptian and Saudi Arabian pregnant women. **Design:** A descriptive comparative study design. **Settings:** This study included two settings: antenatal clinics at the Obstetric and Gynecological center, Mansoura university hospital, Egypt and Shamsan health care center, Abha city, Saudi Arabia. **Subjects:** A purposive sample consisted of 520 pregnant women (260 from each country). **Tools:** A structured interview questionnaire included four parts: socio-demographic characteristics, Obstetric and medical data, women's acceptance regarding COVID -19 vaccine and level of trust toward COVID-19 vaccine. **Results:** Majority of the Egyptian and Saudi women were aware of COVID-19 Vaccine types. About two-thirds of the Saudi women accepted to take the vaccine compared to more than half of the Egyptian women. More than two thirds of the Egyptian women were strongly certain regarding Sinopharm, while the majority of Saudi women were strongly certain toward Pfizer vaccine. In addition, more than half of the Saudi women preferred to take the vaccine during pregnancy, but the Egyptian women preferred to take after delivery. **Conclusion:** Majority of women in both countries were aware of different vaccine types, but level of acceptance to take the vaccine during pregnancy was higher among Saudi than Egyptian women. **Recommendations:** Educational sessions regarding COVID-19 vaccination should be planned and targeting pregnant women to improve their acceptance and increase vaccine uptake.

Key words: Acceptance, COVID-19 vaccine, Pregnant women.

Introduction

The World Health Organization (WHO) identified corona virus disease a Public Health Emergency of International Concern (PHEIC) on January 31, 2020, and a pandemic on March 11, 2020 (**Guan, 2020**). COVID-19 pandemic has a negative consequence on the healthcare delivery system, mainly maternity healthcare, due to lockdown, limited in-person antenatal visits, physical and psychological burden of the pandemic (**Hua & Shaw, 2020).**

Pregnant women considered among high-risk groups who develop more severe symptoms following respiratory viruses infection. SARS-CoV has been related to greater case fatality rates and more severe consequences during pregnancy as a result of the physiological changes in the immune and cardiac systems during pregnancy **(Wang,**

2020). The WHO has set a target product profile for COVID-19 vaccinations and recommends receiving the vaccine during pregnancy to prevent adverse pregnancy outcomes **(WHO, 2022).**

Vaccination is considered the most dependable and affordable public health initiatives that has been used to save millions of lives annually **(Lurie et ., 2020).** COVID-19 vaccine is an important priority to control the COVID-19 pandemic, limit infection and decrease the severity of the disease especially among vulnerable population including pregnant women. There are many types COVID-19 vaccines which include (Pifizer, AstraZeneca, Moderna, Johnson & Johnson (J&J) and Sinopharm) (**Roberts, 2020& Cohen, 2021**).

The Egyptian Drug Authority (EDA) has approved the Sinopharm Chinese vaccine as the first primary vaccine. Egypt started its program toward COVID-19 vaccine in January 2020, and began the vaccination priority with the medical teams in quarantine hospitals, followed by other healthcare personnel. Furthermore, establishing a public immunization website for registration, beginning with high-risk groups. Egypt received the second batch of AstraZeneca vaccine as a component of the COVID-19 Vaccines Global Access Facility late in January, which were the most commonly available types for Egyptians **(WHO, 2021)**

There are numerous factors that influence vaccine acceptance or uptake, including disease risk perception, vaccine safety and efficacy, public's attitude toward the vaccine , prior vaccination, vaccine's price and convenience and certain socio-demographic characteristics of the population **(Cooper et al., 2019).** Prior studies on COVID-19 vaccination have reported a link between some of these factors and COVID-19 vaccine acceptance **(Arce et al., 2021& Cohen, 2021).**

The COVID-19 pandemic presents a vital challenge for countries in providing standardized, essential maternity healthcare services **(UNICEF, 2020 & Tadesse).** Pregnant women infected with COVID-19 are at a greater risk of severe illness, poor pregnancy outcomes, and death. Furthermore, pregnant women with positive COVID-19 infection who were admitted to hospitals were more likely to have iatrogenic preterm labor, be admitted to intensive care, and require mechanical ventilation (**Khalil et al., 2020 & Wang, 2021**).

According to a systematic review and meta-analysis, women with positive COVID-19 infection had a higher prevalence of preterm birth (22%), as well as caesarean section (48%). Also, pregnant women had a greater rate of admission to intensive care unit (7%), compared to non-pregnant women (4%), and approximately 1.9% of infants born to these women had a positive SARS-CoV-2 **(Heath, Khalil, &Le Doare, 2020).** So, it is recommended to include COVID-19 vaccine information as an essential components of the Ante-Natal Care to safeguard women's lives through proper communication, education, and support; to increase woman's awareness and acceptance regarding the vaccine and to decrease vaccine hesitancy during the pregnancy (**Mubangizi, 2022**).

Significance of the Study

In Egypt, positive COVID-19 cases increased exponentially, it reaches 100,708 cases on 9 September, 2020. By April, among the 617 pregnant women with COVID-19, 93 women had required oxygen therapy **(WHO, 2020).** The disease severity was correlated with increased age over 35 years and overweight, in addition chronic diabetes, chronic hypertension, and pregnancy induced hypertension. So**,** initiation of safe and effective vaccines against COVID-19 is a global concern **(Bogoch et al., 2020).**

Although great progress has been made till discovering an effective vaccination program to control COVID-19 infection. There are certain challenges that affect COVID-19 vaccines uptake especially during pregnancy as women always have a concerns regarding the effect of the vaccines not only on themselves but also on their fetuses **(Louie et al ., 2020)**.

As countries policy and regulations can affect vaccine uptake, and the acceptance of the

vaccine could reflect the population's perception and attitude toward the disease risk. So, assessment of pregnant woman's acceptance of COVID-19 vaccine is very necessary to determine their intention regarding the vaccine through a comparative study between Egyptian and Saudi pregnant women.

Study aim

The current study aim was to compare the acceptance of COVID-19 vaccine among Egyptian and Saudi Arabian pregnant women.

Research questions:

• Does the pregnant woman accept COVID-19 vaccine?

• Is there is a difference between Egyptian and Saudi Arabian pregnant women regarding COVID-19 vaccine acceptance?

Subjects and Method:

Study design

A descriptive comparative study design was followed. The STROBE checklist for the descriptive studies was followed.

Study setting

The study carried out at two different countries (Egypt & Saudia Arabia). The first setting was antenatal clinics in obstetric and gynecological specialty center at Mansoura university hospital, Mansoura city, Egypt. This setting provides antenatal and postnatal care, Gynecological treatment, different examinations procedures to women from the surrounding villages. The clinics opens five days weekly through which the women can come to receive the intended care.

The second setting is Shamsan health care center, Saudia Arabia. This center located in Aseer Region at Abha city, Saudi Arabia. This center opens daily except on Friday. It provides many services in different specialties including maternity care through which pregnant women come for follow up or examination.

Sampling: A non probability purposive sample included 520 pregnant women (260 from each country). Eligible women were aged 18 –45 years, read & write, either primi or multi-parous women. While, women who diagnosed, suspected or confirmed COVID-19 infection and who received COVID-19 vaccine previously were not included.

Sample size estimation

Depending on data from **(Mannan and Farhana, 2021)**, to estimate the sample size considered the precision/absolute error of 5% and type 1 error of 5%:

Sample size = $[(Z_{1-\alpha/2})^2.P(1-P)]/d^{2.}$ Which, $Z_{1-\alpha/2}$ = is the standard normal variate, at 5% type 1 error ($p<0.05$) it is 1.96. P = the expected proportion in population based on previous studies. d = absolute error or precision. So, Sample size = $[(1.96)^2.(0.655).(1-0.655]/(0.058)^2$ =259.1; Depending on the previous formula, the sample size needed is 260 from each country.

Data collection tool:

Data was collected through a structured interview questionnaire:

This tool was developed by the researchers following reviewing the relevant literature **(Farhana, &Mannan, 2021)**. It consisted of four parts:

Part 1: Socio-demographic data included age, marital status, occupation, educational level, socio-economic status, and residence, personal career, husband career, number of people in the house hold, and nationality.

Part II: Obstetric & medical data as gestational age, parity, gravidity, number antenatal visits, number of children and current medical or obstetrical complications... etc.).

Part III: Pregnant women's Acceptance toward COVID -19 vaccine:

It was a 7 item self- reported questionnaire developed by the researchers based on (**Atalay et al., 2021; Buckus, Hoque, & Van Hal, 2020).** It assessed the pregnant women's acceptance toward COVID-19 vaccine. It included items as (Awareness of COVID-19 vaccine, types of vaccines, preferred time to take it, source of information regarding vaccine, perceived likelihood to take the vaccine, reasons of acceptance, reasons of refusal or hesitancy).

Part IV: Pregnant women's level of trust toward COVID -19 vaccine :

This part was adopted from **(Deng et al., 2021)** to assess the pregnant women's level of trust toward COVID-19 vaccines in relation to their technology. Pregnant women level of trust was assessed toward the current available vaccine (Pifizer, Moderna, Astrazeneca, Sinopharm and Johson&Johson) . A scoring system was applied to each item using a 5 point likert scale from strongly uncertain , to strongly certain. The higher the scores, the higher the level of trust toward the vaccine.

Validity & Reliability:

The content validity was determined by three expertise, in woman's health and midwifery nursing speciality. The revised questionnaire was finalized after considering their comments. Part II &III of the tool were checked for its reliability by using Cronbach's α (alpha) in a Statistical Package for Social Science (SPSS) version 21 and were (0.088& 0.086) for acceptance and trust respectively.

Pilot study

The Pilot study included 10% of pregnant women (26 pregnant women / each country) to evaluate the quality and comprehensiveness of the questionnaire. Based on the findings of the pilot study, necessary modifications was done as simplifying certain sentences to be easily understood by the pregnant women. Participants who conducted the pilot study was not included in the study sample.

Ethical concerns

An ethical approval was received from Research Ethics Committee, Faculty of Nursing, Mansoura University with REF. Code (0.334). Also, an approval was obtained from the head of the antennal clinics at the Specialized centre, Mansoura University, Egypt and from Shamsan health care center, Saudi Arabia. Each participant at both countries signed the informed consent after clarification of the aim and scope of the study. Participants could discontinue the study at any time. The collected data was kept confidential, and the information was only used for research and publication..

Research process

Two phases was followed:

I-Preparatory phase:

During this phase, approval from the concerned authorities in the previous mentioned settings, data collection questionnaire, and the pilot study were done. This stage lasted about two month from the beginning of January to the end of February, 2022.

II- Data collection phase :

This phase was carried out from the beginning of March to the end of August, 2022. Data was collected from the two centers (Mansoura center, and Shamsan center) paralleled at the same time, in which the researchers at Saudi Arabia collected from there, and the other researchers collected the data from Egypt.

The researchers visited the prior mentioned settings three times per week from 9:00 am to 2:00 pm. The pregnant women attended the centers to receive the antenatal care, and while they were waiting for their examination or follow-up. The women were approached by the researchers who explained the purpose of the study. Each woman who agreed to participate in the study provided

written informed consent. The researchers informed the eligible women that they would meet with them again after they completed their examination.

After the eligible women finished their intended care, the researchers conducted a personal interview in a private area with every woman and explained to her how to fill the questionnaire. First, socio-demographic, obstetric and medical data were collected. Next, level of acceptance and trust were assessed. During the data collection process, the researchers followed the COVID-19 pandemic's recommended protective measures. Each woman's interview lasted about 25 to 30 minutes. The researchers continued to attend the predetermined settings until the data collection process was completed.

Statistical analysis:

SPSS for Windows version 21.0 (SPSS, Chicago, IL) was used to analyze the data. All continuous age data were normally distributed and expressed as mean standard deviation (SD). Categorical data for other socio-demographic variables, obstetric and medical data, and COVID-19 vaccine acceptance were collected in numbers and percentages. For comparing variables with categorical data among participants from each country, the Chi-square test was used. The threshold for statistical significance was set at $p < 0.05$.

Results

Table 1. shows the mean age was(26.5 ±5.4 & 27.2 ±5.9) among Egyptian and Saudi women respectively. More than half of women in both countries were housewives, had a secondary education, and from urban areas. Also, less than one third of women in both groups has less than 4 people in household including elderly people. There was no significant difference among both groups in both countries regarding socio-demographic characteristics.

Figure 1. illustrates that 80.4% of the Egyptian women and 78.5 % of the Saudi women aware of COVID-19 Vaccine.

Table 2. presents that the majority (80% & 79.2%) of Egyptian and Saudi women respectively were multi-gravidas. More than one third of them in both groups were more than 20 weeks of gestation. More than half (71.2% &66.2%) %) of Egyptian and Saudi women respectively attended ≥ 4 antenatal visits. Less than one quarter of them had pre-eclamsia in their current pregnancy and 23.8% of the Egyptian women and 30.0% of the Saudi women had previous COVID-19 infection.

Table 3. represents that there was a highly statistical significant differences regarding level of COVID-19 vaccine awareness among Egyptian and Saudi women Egyptian women. As more than two thirds of them were aware of Sinopharm followed by AstraZeneca vaccine (79.4% &75.6 %) respectively . Compared to the Saudi women, most of them were aware of Pfizer followed by AstraZeneca vaccine(88.2% & 78.9%) respectively. Most of women in both groups had a lower level of awareness regarding Moderna vaccine.

Table 4. reveals that more than two thirds of studied Egyptian women were strongly certain regarding Sinopharm followed by AstraZeneca and Pfizer vaccine. (79.3%, 78.7% & 71.9%) respectively. Compared to Saudi women, majority of them were strongly certain toward Pfizer followed by AstraZeneca vaccine (90.3 % &89.1 %) respectively.

Figure 2. reveals that T.V. and relatives and friends were the main sources of information among studied Egyptian women (71.9% &44.2 % respectively). While the main source of information among the studied Saudi pregnant women were social media followed by searching internet which represented 79.2 % &75.8 respectively.

Figure 3. reveals that 74.2 % of the Saudi women accepted to take the vaccine, compared to 69.6 % among Egyptian women. Only, 13.5 % of Egyptian women refused taking the vaccine compared to 8.5 % among Saudi women.

Table 5. shows that there was a highly statistical significant difference regarding reasons of acceptance of COVID-19 vaccine among Egyptian and Saudi women. 85.6% of Egyptian women accepted to take the vaccine because it decrease the COVID-19 symptoms compared to 44.6% among Saudi women. While, 86.0 % of the Saudi women accepted to take the vaccine to protect themselves from infection compared to 60.8% among Egyptian women.

Figure 4. illustrates that 64.8 % of the Saudi women preferred to take the vaccine during pregnancy, While, 63% of the Egyptian women preferred to take the vaccine after delivery.

Table 6. clarifies that 65.8 %, 45.6 % &40.5 % respectively of the Egyptian women refused to take the vaccine because of fear adverse maternal effects, adverse fetal effects, and unknown long term effects . While, 85.1 %, 55.2 %, &52.2 % respectively of the Saudi women refused to take the vaccine because their husband did not give them the permission to take the vaccine, auto-immue induction, and fear of adverse maternal effects

Table 1. Socio- demographic characteristics of the studied pregnant women (N =520).

Items	Egyptian Pregnant women		Saudi Pregnant women		Chi-Square	
	N	%	N	%	X^2	P Value
Age (Years)						
< 30	186	71.5	182	70.0		
30 – 40	72	27.7	70	26.9		
> 40	2	0.8	8	3.1	3.672	0.159
Mean ±SD	26.5 ±5.4		27.2 ±5.9		1.411	0.158
Marital Status						
Married	222	85.4	220	84.6		
Divorced / Widowed	38	14.6	40	15.4	0.06	0.806
Occupation						
Employed	83	31.9	79	30.4	0.143	0.705
Housewife	177	68.1	181	69.6		
Educational level						
Primary school	35	13.5	37	14.2		
Secondary school	133	51.2	138	53.1	0.425	0.809
University or more	92	35.4	85	32.7		
Medical	88	33.8	72	27.7		
Residence						
Rural	112	43.1	102	39.2	0.794	0.372
Urban	148	56.9	158	60.8		
Number of living children						
< 4	237	91.2	231	88.8	0.769	0.381
≥ 4	23	8.8	29	11.2		
Number of people in household						
< 4	74	28.5	83	31.9	0.739	0.389
≥ 4	186	71.5	177	68.1		
Elderly people in household						
Yes	86	33.1	69	26.5	2.656	0.103
No	174	66.9	191	73.5		

Table 2. Obstetric and medical data of the studied pregnant women (N=520).

Items	Egyptian Pregnant women		Saudi Pregnant women		Chi-Square	
	N	%	N	%	X^2	P Value
Gravidity						
Primi	52	20.0	54	20.8	0.047	0.828
Multi	208	80.0	206	79.2		
Parity						
Nullipara	49	18.8	49	18.8		
Primipara	80	30.8	90	34.6	0.985	0.611
Multi para	121	46.5	131	50.4		
Gestational age (Week)						
< 20	80	30.8	85	32.7		
20 – 30	95	36.5	82	31.5	1.466	0.480
≥30	85	32.7	93	35.8		
Current Ante natal visits						
< 4 visits	75	28.8	88	33.8	1.510	0.219
≥ 4 visits	185	71.2	172	66.2		
Current medical problems	(n. 82)		(n. 95)			
Anemia	54	20.8	62	23.8	0.710	0.399
Hypertension	7	2.7	9	3.5	0.258	0.612
Heart disease	21	8.1	24	9.2	0.219	0.640
Current obstetric problems	(n. 64)		(n. 65)			
Pre-eclampsia	34	13.1	30	11.5	0.285	0.593
Placenta previa	8	3.1	10	3.8	0.230	0.631
Gestational hypertension	10	3.8	15	5.8	1.051	0.305
Gestational diabetes	12	4.6	10	3.8	0.19	0.662
Previous COVID-19 infection	62	23.8	78	30.0	2.502	0.114
Fatal case of COVID-19	46	17.8	27	17.4	0.008	0.928

Figure 1. Awareness of COVID -19 Vaccine among Egyptian and Saudi women (N=520)

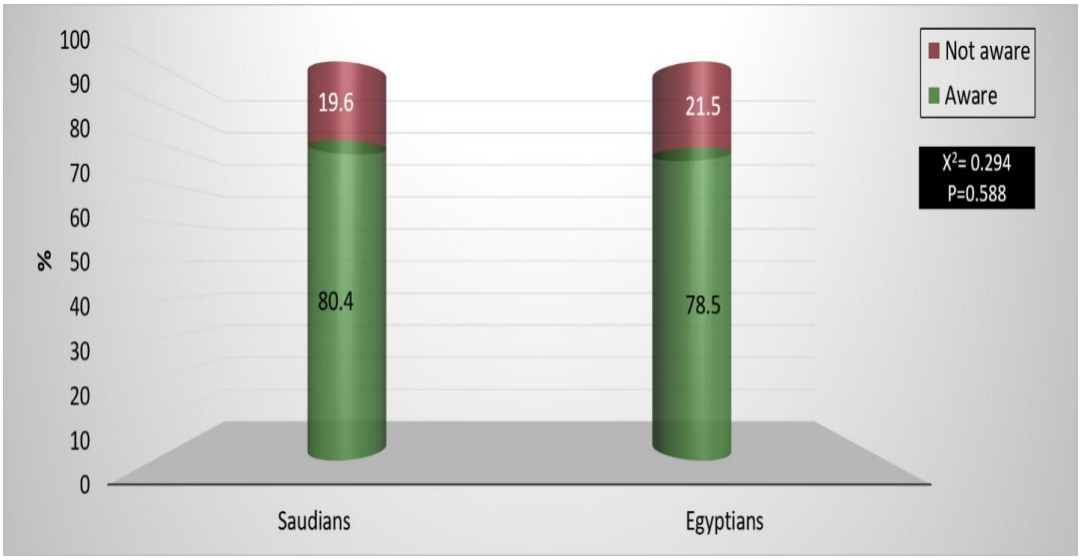

Table (3): Level of awareness regarding types of COVID -19 vaccines among the studied pregnant women (N=520).

	Egyptian Pregnant women				Saudi Pregnant women					
	Aware		Not Aware		Aware		Not Aware		Chi-Square	
Vaccines Types	n	%	n	%	N	%	n	%	X^2	P Value
Pfizer	128	61.2	51	24.4	180	88.2	24	11.8	11.093	<0.001
AstraZeneca	158	75.6	81	38.8	161	78.9	43	21.1	15.355	<0.001
Moderna	7	3.3	202	96.7	5	2.5	199	97.5	0.295	0.587
Sinopharm	166	79.4	43	20.6	2	1.0	202	99.0	263.261	<0.001
Johnson's& Johnson's	12	5.7	197	94.3	8	3.9	196	96.1	0.742	0.389

Table 4. Level of trust towards COVID-19 vaccines among the studied pregnant women (N=520).

Vaccines Type	Egyptian Women										Saudi Women											
	Strongly uncertain		Uncertain		To some extent		Certain		Strongly certain		Strongly uncertain		Uncertain		To some extent		certain		Strongly certain		Chi-Square	
	N	%	n	%	N	%	N	%	n	%	N	%	n	%	n	%	n	%	N	%	X^2	P Value
Pfizer	N = 108										N=186											
	3	2.8	1	0.9	3	2.8	16	14.8	85	78.7	1	0.5	4	2.2	1	0.5	12	6.5	168	90.3	11.732	0.019*
Astrazenka	N = 128										N=110											
	1	0.8	2	1.6	6	4.7	27	21.0	92	71.9	2	1.8	3	2.7	1	0.9	6	5.5	98	89.1	16.390	0.002*
Moderna	N = 47										N = 20											
	1	2.1	4	8.5	35	74.5	7	14.9	0	0.0	1	5.0	1	5.0	7	35.0	11	55.0	0	0.0	12.505	0.005*
Sinopharm	N = 116										N=62											
	5	4.3	2	1.7	3	2.6	15	12.9	92	79.3	42	67.7	10	16.1	7	11.3	2	3.2	1	1.6	130.462	<0.001**
Jonson	N =52										N=86											
	2	3.8	3	5.8	19	36.5	9	17.3	19	36.5	40	46.5	29	33.7	12	14.0	4	4.7	1	1.2	71.151	<0.001**

Figure 2. Sources of information regarding the COVID-19 vaccines among the studied women (N =413)

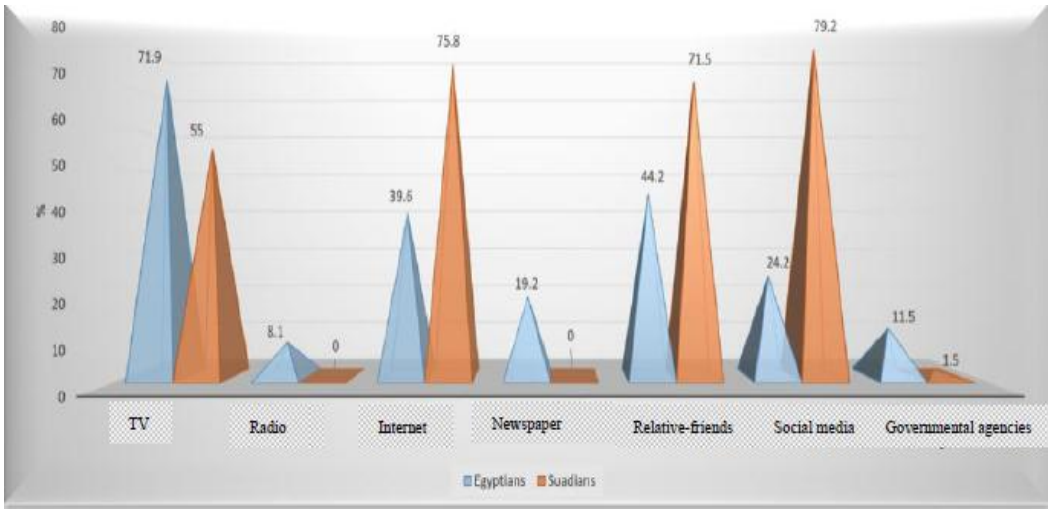

Figure 3. Perceived likelihood of having COVID-19 vaccines among the studied women (N =520)

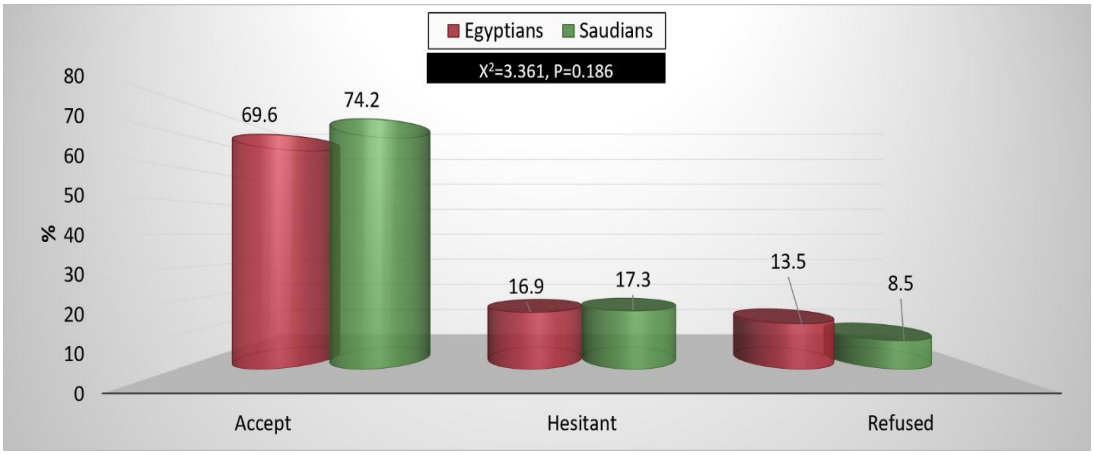

Table (5): Reasons for acceptance of COVID-19 vaccine among the studied pregnant women (N==374).

	Egyptian Pregnant women (n=181)		Saudi Pregnant women (n=193)		Chi-Square	
	n	%	N	%	X^2	P Value
Protect Myself	110	60.8	166	86.0	30.764	<0.001**
Protect My Fetus	96	53.0	92	47.7	1.077	0.299
Prevent Transmission of COVID-19	79	43.6	90	46.6	0.336	0.562
Decrease Symptoms	155	85.6	86	44.6	68.771	<0.001**
Obligatory reasons	142	78.5	128	66.3	6.847	0.008

*Multiple responses are available.

Figure 4. Preferred time for receiving COVID-19 vaccine among the studied pregnant women (N= 374).

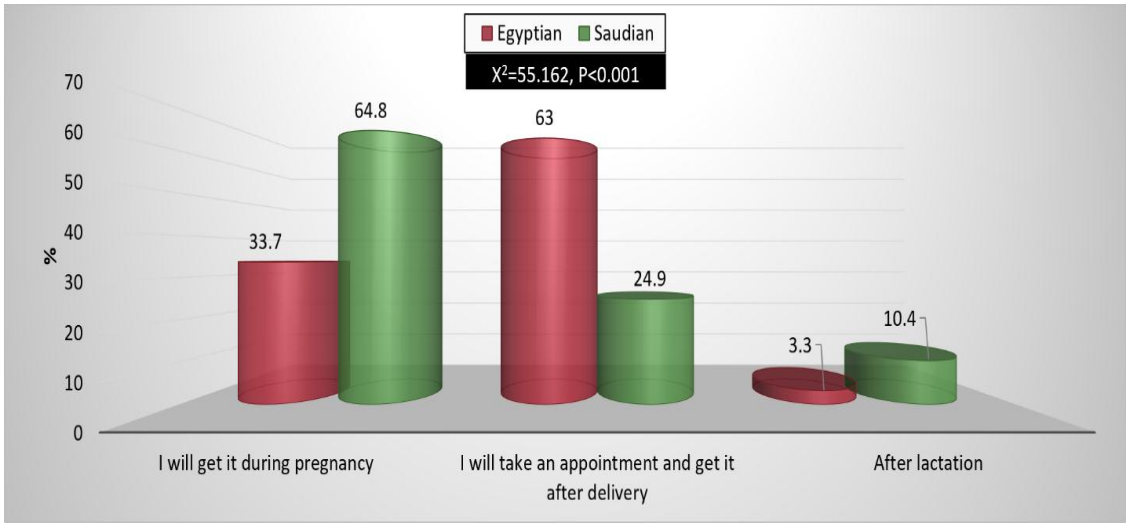

Table (6): Reasons for refusal and hesitancy to take COVID-19 vaccine among the studied pregnant women (N==146).

	Egyptian Pregnant women (n=79)		Saudi Pregnant women (n=67)		Chi-Square	
	n	%	N	%	X^2	P Value
Fear of adverse fetal effects	36	45.6	32	47.8	0.070	0.791
Fear of adverse maternal effects during pregnancy	52	65.8	34	50.7	3.404	0.065
Lack of data about vaccine efficacy	27	34.2	7	10.4	11.427	<0.001
Auto immune induction	28	35.4	35	52.2	4.169	0.041
Unknown long-term effects	32	40.5	33	49.3	1.123	0.289
Severe allergic reactions	23	29.1	37	55.2	10.210	<0.001
Long term adverse effects	30	38.0	15	22.4	4.131	0.042
Vaccine can exaggerate infection	31	39.2	15	22.4	4.771	0.029
I have low risk for infection	30	38.0	23	34.3	0.208	0.648
I am not sure that the vaccine protect from infection	26	32.9	34	50.7	4.764	0.029
My husband didn't give me permission	28	35.4	57	85.1	36.713	<0.001

*Multiple responses are available.

Discussion

The level of vaccine acceptance or uptake reflects the efficacy of vaccination programs among population. Pregnant women's awareness of COVID-19 risk perception plays a critical role in determining their acceptability regarding COVID-19 vaccination (**Ghamri et al., 2022)**.

The present study aim was to compare the level of acceptance of COVID-19 vaccine between Egyptian and Saudi pregnant women. The study results handled the answer of the study questions through assessing the level of awareness, trust and acceptance of COVID-19 vaccine among the studied sample in both countries.

Considering to the socio demographic variables of studied women , the findings of the current study reported that, the mean age was 26.5 ±5.4 & 27.2 ±5.9 among the Egyptian and Saudi pregnant women respectively. These results were aligned with a study done by **Goncu-Ayhan et al. 2021,** who assessed pregnant women's acceptance regarding COVID-19 vaccination and revealed that, the mean age of studied sampled was 27.99 ± 5.6 which is consistence with our findings.

Regarding the studied pregnant women educational level, the current study illustrated that, more than half (51.2% & 53.1%) of studied Egyptian and Saudi pregnant women respectively had a secondary educational level. This is supported by Yancy's (2020) study of pregnant women's willingness to receive the COVID-19 vaccine, which found that more than half of the studied women had a middle-level education.

According to obstetric history of studied sample, the current results revealed that multi gravity represented more than three quarters (80% &79.2%) among Egyptian and Saudi groups respectively. Also, (71.2% &66.2 %) of Egyptian and Saudi women respectively attended four or more antenatal visits and 23.8% & 30.0 % had a history of COVID-19 infection. These was in harmony with **Dhakal et al. (2023)** who assessed awareness and acceptability of pregnant women regarding COVID-19 vaccine and showed that about two thirds of the study participants were multi-gravida and had a prior COVID-19 infection. Moreover, this is in supported by **Dhakal et al. (2023)** who revealed that more than half of studied participants had a history of COVID-19 infection

As regard to current medical problems, the current study illustrated that less than one third of women in both groups had anemia. Also, preeclampsia as current obstetric problem

represented 13.1% among Egyptian women and 11.5% among Saudi women. This finding was in the same line with a study conducted by **Kammili et al. (2021)** who assessed pregnant women's level of acceptance about COVID-19 Vaccine and revealed that about one third of the participants had medical and obstetric co-morbidities.

As regards to COVID-19 vaccine awareness among the Egyptian and Saudi women, the current study revealed that more than three quarters of studied Egyptian women were aware of Sinopharm vaccine, While the majority the Saudi pregnant women were aware of Pfizer vaccine. These results were in consistence with Egyptian study by **boshra et al. (2022)** who concluded that Egyptian population possessed enough understanding regarding Sinopharm vaccine. Also, WHO, 2022 recommendation supported the Saudi results as the safety regarding COVID-19 infection is minimized with Pfizer vaccine. This can be explained as Sinopharm vaccine was the most available vaccine in Egypt than Pfizer vaccine which was available in Saudi Arabia. So, the participants knowledge and awareness of the vaccine type depends on the availability of certain vaccine in their countries.

Additionally, there was a highly statistical significance ($p<0001$) among studied Egyptians and Saudi women according to their COVID-19 vaccine awareness. This was in contrast with a previous study carried out in the United States by **Battarbee et al. 2021)**, who observed that, less than half of studied pregnant women were not aware or have in adequate information regarding COVID-19 vaccination, which negatively affect their level of acceptance toward the vaccine.

Concerning the main sources of information of COVID-19 vaccines, the current study revealed that, more than two thirds of studied Egyptian women considered television as main sources of information regarding the COVID-19 vaccines. While, social media was the main sources of information among Saudi women. These findings contrasted with those of **Gunawardhana et al. (2022),** who compared pregnant women's perceptions of COVID-19 infection and vaccination and discovered that the top three sources of health information cited by participants were healthcare workers in facilities (70%), radio (11%), and social media (5%). According to 82% of participants, healthcare professionals are the most trusted sources of information.

Considering participants' level of trust towards COVID-19 vaccines, the present study clarified that, more than three quarters of studied Egyptian women had a strong level of trust toward Sinopharm vaccine. While, majority of Saudi women had a strong level of trust toward Pfizer vaccine. The findings were consistent with **Mappa et al. (2021),** who evaluated the acceptance of COVID-19 vaccine and reported that trust in specific COVID-19 vaccine and fewer concerns about its safety and side effects were the main barriers to COVID-19 vaccine uptake. Similarly, trust in the safety and efficacy of COVID-19 vaccines, as well as trust in vaccine-related information, influence pregnant women's vaccine choice.

From researcher point of view, country regulation during the pandemic should consider the available data and recommendations to improve trust and confidence related to COVID-19 vaccine among pregnant women. **Centre for Disease Control (CDC, 2022)** proved the safety and effectiveness of COVID-19 vaccination for pregnant women. Additionally, The WHO recommended using the Pfizer COVID-19 vaccine during pregnancy as the benefits from receiving exceed its the risks **(WHO, 2022).**

Regarding reasons of acceptance to take vaccine , the present study found that there was highly statistical significant differences regarding reasons of acceptance of COVID-19 vaccine among Egyptian and Saudi women. As 85.6% of Egyptian women accepted to take the vaccine because it decreases the COVID-19 symptoms compared to 44.6% among Saudi women. While, 86.0 % of the Saudi women accepted to take the vaccine to protect themselves from infection compared to 60.8% among Egyptian women.

This was supported by a recent systematic review and meta-analysis conducted

by **Ma et al. (2022)** who found that most of the participants accepted to receive COVID-19 vaccine because it minimize the risk of infection, hospitalizationn and control the adverse pregnancy outcomes. From researcher view of point, the COVID-19 vaccine has been shown to be safe and effective in pregnant women. Many organizations, including the Centers for Disease Control (CDC), the Society for Maternal Fetal Medicine, and the American College of Obstetrics and Gynecology, support the importance of receiving COVID-19 vaccines during pregnancy to prevent and control both maternal and neonatal adverse effects.

Concerning the preferred time of receiving a vaccination among studied sample during pregnancy, the current study found that 64.8 % of the Saudi women preferred to take the vaccine during pregnancy, While, 63% of the Egyptian women preferred to take the vaccine after delivery. The Egyptian finding was supported by a previous study in Turkey done by **Goncu-Ayhan et al. (2021)** which showed that the studied women expressed a lower vaccine acceptance rate during pregnancy.

Also, **Prasad, et al. (2022)** who conducted a systemic review and meta-analysis to evaluate the pregnancy outcomes for women who took COVID-19 vaccination and concluded that the strong recommendations for COVID-19 vaccination was during reproductive age and during lactation, with a little percentage to take COVID-19 vaccine during pregnancy. While, the Saudi findings was supported by **Skirrow et al**. **(2022)** who assessed women's views regarding acceptance of COVID-19 vaccination during and after pregnancy, and found that, a more than half of studied sample accepted to receive the vaccine while they were pregnant. This may be due to difference of policy among countries as COVID-19 vaccination was obligatory to be taken during pregnancy in certain countries

Focusing on the reasons of refusal COVID-19 vaccines among the studied sample, the current study clarified that, more than half of the Egyptian women refused to take the vaccine because of adverse maternal effects. While, most common cause of refusal among the Saudi women was their husband did not give them the permission to take the vaccine. This finding was accordance with Chinese study by **Tao et al. (2021)** which revealed that the major reasons for COVID-19 vaccine rejection was un safety, adverse effects of the vaccine, and believing that the vaccine might harm the foetus. Also, these findings are supported by **Goncu-Ayhan et al. (2021)** and concluded that, The primary reason for vaccine rejection was a lack of evidence on COVID-19 vaccine safety, followed by a fear that the vaccine would harm the baby. This is easily explained by a mother's natural fear of her pregnancy.

Conclusion

Depending on the current study findings, it can be concluded that the majority of the Egyptian and Saudi women were aware of COVID-19 Vaccines. About two-thirds of the Saudi women accepted to take the vaccine compared to more than half of the Egyptian women. Regarding level of COVID-19 trust more than two thirds of studied Egyptian women were strongly certain regarding Sinopharm compared to Saudi women, as the majority of them were strongly certain toward Pfizer. In addition, the current study reported that more than half of the Saudi women preferred to take the vaccine during pregnancy. While, more than half of the Egyptian women preferred to take the vaccine after delivery.

Furthermore, there was a highly statistical significant differences regarding reasons of acceptance of COVID-19 vaccine among Egyptian and Saudi women. Most of Egyptian women accepted to take the vaccine because it decrease the COVID-19 symptoms. While, most of the Saudi women accepted to take the vaccine to protect themselves from infection. As well as, more than half of the Egyptian women refused to take the vaccine because of adverse maternal effects. While, most of the Saudi women refused because their husband did not give them the permission to take it because of his fear from adverse maternal and fetal effects.

Limitation:

There was no limitation faced the researchers during conduction the current research.

Recommendations:

Depending on the study findings, the following is recommended:

- Educational sessions should be planned and targeting pregnant women to increase their awareness regarding necessity of COVID-19 vaccine.
- Importance of including COVID-19 vaccine information as an important part of antenatal health education programs .
- Social media campaigns should be conducted to increase pregnant women awareness and acceptance regarding COVID-19 vaccination.

Further Researches:

- To assess the effects of COVID-19 vaccination on pregnancy outcomes.

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Conflict of Interests

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