Original Article

Comparison of Vaccine Acceptance between COVID- 19 and Seasonal Influenza among Pregnant Women, in Saudi Arabia

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ABSTRACT

Influenza is a leading cause of morbidity and mortality worldwide, and pregnant women are at a higher risk of severe complications than the general population. Influenza could spread alongside COVID-19. The study aim to evaluate and contrast the levels of acceptance of the COVID-19 vaccination with the seasonal influenza vaccine among Saudi Arabian expectant mothers. This observational qualitative cross-sectional study was conducted among pregnant women in Saudi Arabia in July 2022. Probability simple random sampling techniques were employed to select the population. Data was collected through an online distributed Google form questionnaire based on the Health Beliefs Model. The data were analyzed using the Statistical Package for the Social Sciences (SPSS). A total of 1,790 respondents were included in this study. Most of our participants were between 25-29 years (32.1%), and 28.7% were aged between 30-34 years. Most participants did not have any chronic illness (88.9%). Diabetes was the most commonly reported chronic disease among respondents. 45.1% disagreed that the seasonal influenza vaccine made the pregnant lady more likely to have a severe illness, and 43.1% disagreed with the same principle when receiving the COVID-19 vaccine. In addition, more than half of the participants disagreed with the statement that Seasonal influenza vaccination is unsafe, and 54% disagreed with the statement that COVID-19 vaccination is unsafe (P value =0.024). Results concluded that the level of acceptance to receive the COVID-19 vaccine (96.1%) was significantly higher than the level of acceptance to receive the influenza vaccine among pregnant women in Saudi Arabia.

Key words: *Saudi Arabia, Comparison of acceptance, Pregnant women, Seasonal influenza vaccine, Covid-19 vaccine*

INTRODUCTION

Coronavirus disease (COVID-19) is a contagious respiratory disease that originates from the SARS-CoV-2 virus [1, 2]. It can cause symptoms ranging from mild to severe, such as fever, headache, cough, shortness of breath, etc. [3, 4]. The world's first case of COVID-19 was on December 31, 2019; however, in 2022, the number of COVID-19 cases reached more than 500 million worldwide [5, 6]. Moreover, due to the wide spread of the virus, the importance of discovering a drug or vaccine that prevents or alleviates the symptoms of the COVID-19 virus has increased. Pfizer- BioNTech with a 95% success rate in preventing COVID-19 infections, the COVID-19 vaccine was the first to be licenced by the US Food and Drug Administration [7]. After recognizing the first vaccine against COVID-19, vaccine and pharmaceutical companies began to compete fiercely to produce more effective vaccines against COVID-19. Several vaccines have been invented to fight COVID-19

infection, such as Moderna, Oxford-AstraZeneca, Novavax, and Janssen vaccines [8]. Despite the vaccine industry's revolution, many concerns and controversies have been raised about the safety of administering vaccines to children and pregnant women. Although the World Health Organization declared the vaccine safe and effective for pregnant women, there are still many doubts and myths circulating about its potentially harmful effects on this category [9-11]. According to a study conducted on multiple racial and ethical groups in eight US-integrated healthcare organizations, the acceptance of COVID-19 vaccines during pregnancy was lowest among Black and Hispanic women. The most common reason for this was their fears of possible harmful effects on their infants [12].

Similarly, another cross-sectional study was conducted in 16 different countries using a distributed online survey. The study concluded that the main reason for pregnant women's refusal was either their concerns about the harmful effects of the vaccine on their fetuses or because they suspected that the FDA approved the vaccine for political reasons [13]. In an attempt to address the factors associated with vaccine acceptance, a Chinese study was conducted on more than 3,000 women of childbearing age to compare the approval of the COVID-19 vaccine and the seasonal influenza vaccine. They concluded that the acceptance rate of the COVID-19 vaccine (90.3%) was markedly higher than the acceptance rate of the seasonal influenza vaccine (85%) [14]. In Saudi Arabia, several studies were done to explore the acceptance of the COVID-19 vaccine in pregnant women. A moderate level of awareness and up to 65% of hesitation toward the vaccine were the results of one study conducted on 431 women in Saudi Arabia [15]. Similarly, another larger study conducted on more than 5,000 pregnant women showed that 68% of pregnant women were willing to receive the vaccine or were already vaccinated [16].

During influenza season, pregnant women showed a marked increase in susceptibility to influenza infection and its complications [17]. In order to effectively control vaccine-preventable diseases in the civilian population of the United States, the Advisory Committee on Immunization Practices (ACIP), which is made up of medical and public health specialists, develops recommendations and guidelines for the Director of the CDC, currently recommends seasonal influenza vaccines for pregnant women during the second and third trimesters and during the first trimester for women with a high-risk medical condition, such as asthma [18, 19]. Despite the reported data that influenza can spread in parallel with COVID-19 and the significantly increased risk of morbidity and mortality in pregnant women with co-infections of COVID-19 and influenza, vaccination rates remain low in this group [20]. This study aims to evaluate and compare the acceptance of the COVID-19 and influenza vaccines among pregnant women in Saudi Arabia. In order to comprehend the aspects associated with accepting or rejecting vaccines during pregnancy and provide possible solutions, instructions, and preventive measures that would enhance vaccination awareness among pregnant women. The main question of the research is whether the acceptance or rejection of vaccinations among pregnant women during pregnancy is related to the type of vaccine by comparing pregnant women's attitudes toward receiving the COVID-19 vaccine and the seasonal influenza vaccine during pregnancy.

MATERIALS AND METHODS

A cross-sectional online questionnaire on COVID-19 and influenza vaccine acceptance among pregnant women was conducted in Saudi Arabia in July 2022. The King Salman bin Abdulaziz Medical City Institutional Review Board approved the study. The study approval number is 22-062. The study design is an observational, qualitative, cross-sectional study. The sample size was calculated using OpenEpi 3.01. The sample size estimation is unknown due to the lack of published research in this area. However, the study involved approximately 3,213 participants. The questionnaire was adapted and translated from Paget *et al.* study [21], a previous study conducted in China in the same area. The sampling technique was a simple random sampling based on probability. The sampling frame is the total number of responses that fit the inclusion criteria. The study subjects will include all pregnant women aged 18-49 starting in July 2022. An online, distributed Google Forms questionnaire based on the Health Beliefs Model, a widely used model for assessing health beliefs, was used to collect the data. The questionnaire was randomly distributed in Arabic and English to friends, families, relatives, and citizens living in Saudi Arabia via email and social media platforms such as Telegram, WhatsApp, and Twitter. All pregnant women in Saudi Arabia were included in the study. Women who were not pregnant, pregnant women who refused to participate in the study, or women who were living outside Saudi Arabia were excluded.

Data management and analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 23.0 (IBM Cooperation, Armonk, NY, USA). Categorical data were presented as frequency and percentages, while continuous data were presented as mean and standard deviation (SD). The chi-square test was used to test and describe the relationship between categorical data. A P-value less than 0.05 was considered statistically significant.

Ethical considerations

KSAMC's IRB is pleased to inform you that your study mentioned below has been reviewed and approved (IRB number: 22-062). This study compares vaccine acceptance between the COVID-19 vaccine and the seasonal influenza vaccine among pregnant women in Saudi Arabia. Participation is voluntary, and patients have the right to decline without explanation. Also, the responses were kept confidential.

## RESULTS AND DISCUSSION

Characteristics of the respondents

This study included 1,790 respondents. One-third of the participants (32.1%) were between the ages of 25 and 29, and 28.7 percent were between the ages of 30-34. The majority of participants were Saudi Arabian (93.3%). Regarding our participants' education level, we found that more than half were college students (59.1%), 29.4% of them achieved a school education, and only 8.7% were postgraduates. Furthermore, our findings revealed that our participants were evenly distributed across all regions of Saudi Arabia (the northern, southern, central, eastern, and western regions), with 20% in each. When assessing the marital status of our respondents, we found that most of them were married (94.7%). Our findings revealed that 44% of participants were pregnant in the 2nd trimester, 29% in the 3rd trimester, and 27% in the 1st trimester. Concerning the health status of respondents, the majority of them did not have any chronic illness (889.9%), as illustrated in **(Table 1)**.

Table 1. Socio-demographic characteristics of the respondents (n=1,790)

Variable	Category	Frequency	percent
Age	18-24	253	14.1%
	25-29	574	32.1%
	30-34	514	28.7%
	35-39	333	18.6%
	40-44	87	4.9%
	45-49	29	1.6%
Nationality	Saudi	1670	93.3%
	Non-Saudi	120	6.7%
Level of Education	Illiterate	51	2.8%
	School	527	29.4%
	College	1057	59.1%
	Postgraduate	155	8.7%
In which region do you live?	Northern region	358	20%
	Southern region	358	20%
	Central Region	358	20%
	Eastern Region	358	20%
	Western Region	358	20%
Marital status	Single	13	0.7%
	Married	1696	94.7%
	Divorced	47	2.6%
	Widow	34	1.9%
If yes, in which month?	1st trimester	484	27%

	2nd trimester	787	44%
	3rd trimester	519	29%
Do you have a chronic disease?	Yes	198	11.1%
	No	1592	88.9%

Our results reported that diabetes was the most commonly reported chronic disease among respondents (25.3%), followed by hypertension (19.7%), asthma, and thyroid disorders, reported by 10.1% for each, as demonstrated in **Figure 1**.
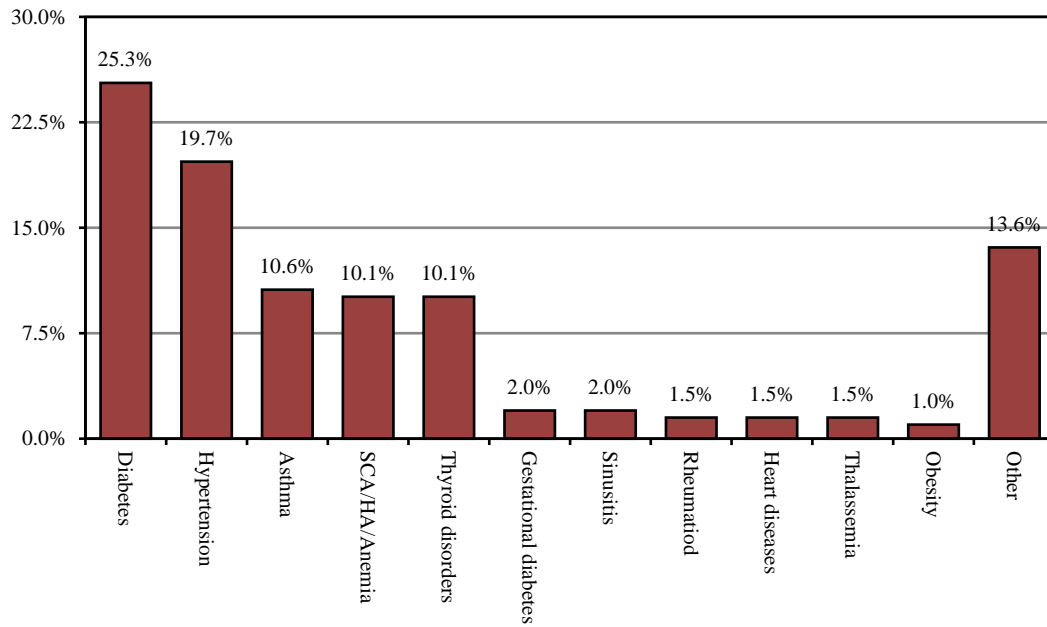
Figure 1. History of chronic diseases (n=198)

Comparing the COVID-19 vaccine and the seasonal influenza vaccines for vaccine acceptance among pregnant women

According to our results, we found that the majority of participants received a dose of the COVID-19 vaccine, 96.1%, whereas 53.7% of them received a dose of the seasonal flu vaccine. This difference was found to be significant (P value < 0.001). Out of the participants who received the COVID-19 vaccine (n=1,720), 29 (1.7%) received one dose, 271 (15.8%) received two doses, 1295 (75.3%) received three doses, and 35 (2%) while 90 (5.2) did not remember.

When asking our respondents regarding concerning about getting infected by influenza and COVID-19, 45% stated that they were not concerned about getting influenza and 41.6% were concerned about getting COVID-19. This difference was found to be significant (P value < 0.001). When directed the same statement toward their family members, we found that 42.4% were not concerned about their family members getting influenza. On the other side, only 28.6% were not concerned about their family members getting COVID-19. This difference was found to be significant (P value < 0.001).

Regarding the perception of severity toward vaccines, our results demonstrated that 45.1% disagreed that the seasonal influenza vaccine made the pregnant lady more likely to have a severe illness, and 43.1% disagreed with the same principle when receiving the COVID-19 vaccine. This difference was found to be significant (P value =0.044).

When assessing the barriers to vaccination, we found that 41.6% of those polled disagreed that receiving an influenza shot can make one more susceptible to seasonal flu., whereas 46.9% disagreed with the same principle regarding the COVID-19 vaccine. This difference was found to be significant (P value < 0.001). Moreover, 58.5% of respondents disagreed with the statement that Seasonal influenza vaccination is not safe, and 54% disagreed that COVID-19 vaccination is not safe (P value =0.024). Regarding the effectiveness of the vaccines, our result revealed that When asked if the vaccine could successfully protect women against seasonal influenza,

40.7% disagreed, and 43.9% disagreed with the statement regarding the COVID-19 vaccine. This difference was found to be significant (P value =0.007) as illustrated in **Table 2**.

In addition, our findings reported that 58.4% of participants agreed that getting the influenza vaccine benefits women. However, 47.3% of women getting the COVID-19 vaccine is a benefit for women. This difference was found to be significant (P value < 0.001).

Our results found that 73.2% of respondents would get vaccinated if a physician recommended influenza vaccination. Conversely, 64.2% would get vaccinated If a physician recommended COVID-19 vaccination. This difference was found to be significant (P value < 0.001). Furthermore, 49.2% would receive the influenza vaccine if a family member recommended vaccination, and 45.5% would receive the COVID-19 vaccine (P value =0.029).

Table 2. Comparison of vaccine acceptance between COVID- 19 Vaccine and Seasonal Influenza Vaccine

Statement	Yes	No	P value
	N (%)		
Have you ever received a dose of the seasonal flu vaccine?	962 (53.7)	828 (46.3)	< 0.001
Have you ever received a dose of the COVID-19 vaccine?	1720 (96.1)	70 (3.9)	

To which extent are you concerned about the following statements?	Not concerned	Concerned	Very concerned	
I'm concerned about getting influenza	819 (45.8)	466 (26)	505 (28.2)	< 0.001
I'm concerned about getting COVID-19	534 (29.8)	744 (41.6)	512 (28.6)	
I'm concerned about my family members getting influenza	759 (42.4)	721 (40.3)	310 (17.3)	< 0.001
I'm concerned about my family members getting COVID-19	512 (28.6)	805 (45)	473 (26.4)	

Perceived severity	Agree	Disagree	Not sure	
If a woman gets seasonal influenza, she is more likely to have severe illness	383 (21.4)	807 (45.1)	600 (33.5)	0.044
If a woman gets COVID-19, she is more likely to have severe illness	446 (24.9)	772 (43.1)	572 (32)	

Perceived barriers				
Seasonal influenza vaccination can cause a person to get sick with seasonal influenza	467 (26.1)	744 (41.6)	579 (32.3)	< 0.001
Seasonal COVID-19 vaccination can cause a person to get sick with COVID-19	376 (21)	840 (46.9)	574 (32.1)	
Seasonal influenza vaccination is not safe	314 (17.5)	1047 (58.5)	429 (24)	0.024
COVID-19 vaccination is not safe	345 (19.3)	966 (54)	479 (26.8)	
The vaccine is not an effective way to prevent a woman from getting seasonal influenza	580 (32.4)	728 (40.7)	482 (26.9)	0.007
The vaccine is not an effective way to prevent a woman from getting COVID-19	602 (33.6)	786 (43.9)	402 (22.5)	

Perceived benefits				
Getting the influenza vaccine is a benefit for women	1046 (58.4)	280 (15.6)	464 (25.9)	< 0.001
Getting the COVID-19 vaccine is a benefit for women	847 (47.3)	491 (27.4)	452 (25.3)	

Cues to action				
If a physician recommends influenza vaccination, I will get vaccinated	1310 (73.2)	248 (13.9)	232 (13)	< 0.001
If a physician recommends COVID-19 vaccination, I would get vaccinated	1150 (64.2)	410 (22.9)	230 (12.8)	
If family members recommend influenza vaccination, I would get vaccinated	881 (49.2)	464 (25.9)	445 (24.9)	0.029
If family members recommend COVID-19 vaccination, I would get vaccinated	815 (45.5)	531 (29.7)	444 (24.8)	

In this study, we compared and evaluated how well pregnant women in Saudi Arabia accepted the COVID-19 vaccine with the seasonal influenza vaccine. The COVID-19 and influenza vaccines are particularly crucial for disease prevention since, in the case of COVID-19, there is strong evidence that the influenza vaccine has extra positive effects on both health and the economy [21]. The WHO advised pregnant women to get their influenza vaccinations first in 2012 [22]. Worldwide influenza vaccine coverage is still below optimum levels despite increased recommendations to vaccinate pregnant women in many nations.

Existing research has found influenza and COVID-19 vaccine hesitancy in various populations [23]. According to our research, the COVID-19 vaccine had a degree of acceptability that was statistically different from the influenza vaccination's (53.7%) and was much higher (96.1%) (P value 0.001). Another study done in China discovered that the acceptance rate for the COVID-19 vaccination was much greater than the acceptance rate for the influenza vaccine [14]. Only 9.8% of pregnant women in Singapore received the influenza vaccine in 2017, and over half of unvaccinated women indicated they were unlikely to receive the shot [24]. The rate in America was 61.2% during the 2019–2020 season [25], which was below the 80% target set by Healthy People 2020 [26]. From 2013 to 2018, only 21.7% of pregnant women in New Zealand received influenza vaccines [27].

When we assessed the perception of severity toward vaccines, we discovered that 45.1% of pregnant women disagreed that the seasonal influenza vaccine made them more likely to have a severe illness, and 43.1% disagreed with the same principle when receiving the COVID-19 vaccine. This is congruent with research from China, where it was discovered that COVID-19 was seen as being more serious than influenza, which may encourage pregnant women to pay greater attention to COVID-19 prevention [14]. In addition, 46.9% of respondents disagreed with the idea that the COVID-19 vaccine may have the same effect as the influenza vaccine in terms of making someone sick with seasonal influenza, whereas 41.6% disagreed with this idea. COVID-19 and influenza vaccination hesitation has been associated with worries about the safety of quickly developed vaccines [23], scepticism in biomedical research [28], a lack of pertinent knowledge [29, 30], fear of adverse occurrences [31], and a lack of recommendations [24].

Furthermore, our findings revealed that 58.5% of respondents disagreed with the statement that seasonal influenza vaccination is unsafe, and 54% disagreed with the statement that COVID-19 vaccination is unsafe. The safety of COVID-19 vaccinations, their components, or their platforms used in other vaccines during pregnancy is supported by primary and secondary evidence from investigations of vaccine components and platforms also employed by COVID-19 vaccines [32]. The use of influenza vaccines during pregnancy is safe, according to several systematic reviews [33, 34]. Pregnant people were not included in COVID-19 vaccine preauthorization clinical trials, and at the time of emergency use authorization, there was little information on the vaccines' safety during pregnancy in human studies [35]. On the other side, when compared to non-pregnant women, pregnant women with COVID-19 are at a greater risk of bad pregnancy and birth outcomes, as well as severe sickness [36, 37].

The study has a number of restrictions. First off, the impact of specific public health initiatives on vaccine acceptance could not be determined because this was a cross-sectional study looking at women's vaccine acceptance and the factors that influence it. Finally, only women who had access to the online platform were chosen to participate because the questionnaire was disseminated to participants via that platform. The results might not be applicable to all Saudi women as a result.

CONCLUSION

Our findings concluded that the level of acceptance for the COVID-19 vaccine (96.1%) was significantly higher than the level of acceptance for the influenza vaccine among Saudi pregnant women. Researchers should continuously adopt public health measures to increase reproductive women's understanding of diseases and vaccinations and tell them of the severity and susceptibility of COVID-19 and influenza in order to reduce vaccine reluctance, improve vaccine acceptance, and increase vaccine uptake.

ETHICS STATEMENT : KSAMC's IRB is pleased to inform you that your study mentioned below has been reviewed and approved (IRB number: 22-062).

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