

# Knowledge, utilization and barriers of pregnant women to influenza vaccine in primary health care centers in Dammam and Al Khobar, Saudi Arabia, 2017–2018

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**Purpose:** The purpose of this study was to assess the knowledge and utilization of, as well as barriers to, influenza vaccine uptake, and how these things relate to personal factors in pregnant women in Saudi Arabia.

**Patients and methods:** Between November 2017 and April 2018, a cross-sectional survey was conducted among 410 pregnant women attending 23 primary health care centers in Dammam and Al Khobar, Saudi Arabia. A structured questionnaire was used to gather participants' demographic data and to measure their level of knowledge and utilization of, as well as barriers to, influenza vaccine.

**Results:** A total of 57.1% of participants had good knowledge about influenza vaccine during pregnancy, and 19.8% took the vaccine. The most influential factor among those who did not take the vaccine was that the flu vaccine has side effects (34%). Only 36.6% of all participants were ever offered the flu vaccine during pregnancy by a health care provider.

**Conclusion:** The low influenza vaccine uptake due to misconceptions about the associated side effects calls for active awareness programs not only for pregnant women and the general public but also for health care providers in Saudi Arabia. This will not only raise the awareness and utilization of influenza vaccine but also prevent severe illness and complications in mothers and their fetuses.

**Keywords:** influenza vaccine, pregnancy, knowledge and barriers, health care providers

## Introduction

Influenza is a serious disease that can cause hospitalization, intubation, and death in high-risk groups such as pregnant women.<sup>1</sup> Influenza complications are due to changes in the immune, respiratory, and cardiovascular systems. Pregnant women with an influenza infection are at increased risk of severe illness and complications and have a higher mortality and morbidity rate.<sup>2</sup> Furthermore, infants born to mothers with influenza infection are at a higher risk for complications such as preterm birth and low birth weight.<sup>2–4</sup>

Nevertheless, influenza vaccines have proven to be the most effective strategy for preventing severe illness and complications associated with influenza infection.<sup>1</sup> In addition, pregnant women who have been vaccinated pass antibodies on to their developing baby, which will protect the child from influenza and hospitalization in the first 6 months of life.<sup>1</sup>

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Studies have shown no differences in rates of pregnancy complications, such as premature delivery or small gestational age, between pregnant women who received the vaccine and those who did not.<sup>5</sup> For this reason, in 2014, the Ministry of Health in the Kingdom of Saudi Arabia launched a seasonal influenza vaccine to prevent influenza complications in high-risk groups, including pregnant women, during influenza season.<sup>6</sup> This action was also based on the 2004 recommendation of The Advisory Committee on Immunization Practices in the United States.<sup>7</sup>

To our knowledge, only one study regarding pregnant women's awareness and utilization of influenza vaccine has been previously conducted in Saudi Arabia, which was a single-center-based study in Riyadh of a relatively short duration (ie, 6 weeks).<sup>8</sup>

The present study aimed to evaluate the knowledge and utilization of, as well as barriers to, influenza vaccine uptake, and how these things relate to personal factors in pregnant women in Saudi Arabia. It was conducted in a different geographic setup than the previous study, was multi-centric (involving 23 primary health care centers [PHCCs]), and of a longer duration, with a 5-year gap from the previous study in Riyadh. Furthermore, it aimed to provide recommendations to improve influenza vaccine uptake and encourage further research in the province.

## Materials and methods

Between November 2017 and April 2018, a cross-sectional survey was conducted among all pregnant women aged >16 years who were attending PHCCs in Dammam and Al Khobar, Saudi Arabia, at the time. Approval from the Institutional Review Board of the Ministry of Health in Eastern Province was obtained before conducting the study. The study objectives were explained to the patients prior to the interview, and written consent was obtained if the patients verbally agreed to participate. The questionnaire used in this study was previously validated by Mayet et al.<sup>8</sup> It was administered face-to-face in Arabic by a recruited team who were monitored to ensure research quality. Confidentiality and anonymity were preserved.

PHCCs were selected by a multistage cluster and systemic random sampling technique. Stage 1 had two clusters: 18 PHCCs (60%) from Dammam and five PHCCs from Al Khobar (40%). PHCCs were then divided into three groups based on population coverage (ie, high, intermediate, or low). In Dammam, six PHCCs were selected from each population coverage level. In Al Khobar, two PHCCs from both the high and intermediate population coverage levels and one PHCC from the low population coverage level was

selected. In stage 2, all pregnant women who came to the PHCC for any medical or non-medical reasons were given the questionnaire after they provided consent to participate.

The questionnaire consisted of two parts. The first collected patients' demographic characteristics, including age, educational level, employment status, income, number of children, number of pregnancies, pregnancy trimester, and number of follow-up visits. The second part measured their level of knowledge and utilization of, as well as barriers to, the influenza vaccine.

The sample size was calculated by the Raosoft website (<http://www.raosoft.com/samplesize.html>) with a 5% margin of error and 95% CI, according to the population size of childbearing-aged women in Dammam and Al Khobar, Saudi Arabia. The final sample consisted of 410 pregnant women.

Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 23.0 (IBM Corporation, Armonk, NY, USA). Univariate analysis was used for all variables and bivariate analyses. Chi-squared test, an independent sample *t*-test, and ANOVA were used to assess the associations between demographic characteristics and vaccination status. The level of significance was 5% ( $P$ -value  $\leq 0.05$ ).

## Results

A total of 410 pregnant women participated in the survey and 100% completed the questionnaire. Participants' age ranged from 15 to 47 years, with a mean age of 28.8. Only 2% held a postgraduate degree and 22.9% were employed. Other demographic characteristics of the participants are presented in Table 1.

Most (85.1%) of the pregnant women surveyed correctly stated that influenza infection is highly contagious, and 72.4% were aware that pregnant women are at a higher risk of influenza complications than non-pregnant women. There was a common misconception that pregnant women should avoid all types of vaccines (55.1%) and that flu vaccine could cause influenza (56.8%). The knowledge score for the 11 items on the questionnaire ranged from 0 to 10 (mean 6.8, median 7, SD 2.2, quartiles: 5, 7, 9). A total of 176 participants (42.9%) had poor knowledge of the flu vaccine (<6.8) and 234 (57.1%) had good knowledge of it (>6.8). Low income ( $P < 0.003$ ) and low educational level ( $P < 0.003$ ) were significantly associated with poor influenza vaccine knowledge. Good knowledge was significantly higher among women living in Al Khobar than among those living in Dammam ( $P < 0.0001$ ).

Fewer than half of the participants (43.9%) were against taking the influenza vaccine during pregnancy (Table 2). Factors that were found to be significantly associated with

**Table I** Demographic characteristics of pregnant women participating in the survey

Characteristics	Number of patients	%
<b>City of residence</b>		
Dammam	246	60
Khobar	164	40
<b>Age (years)</b>		
<20	17	4.1
20 to <30	217	52.9
30 to <40	152	37.1
≥40	24	5.9
Max =47 years, min =15 years, mean age =29 years		
Below mean age	216	52.7
Above mean age	194	47.3
<b>Educational level (%)</b>		
Postgraduate degree	8	2
Bachelor degree	214	52.2
Secondary or equivalent degree	136	33.2
Primary or intermediate degree	46	11.2
No formal education	6	1.5
High (bachelor and postgraduate)	222	54.1
Low (all others)	188	45.9
<b>Employment status</b>		
Employed	94	22.9
Unemployed	316	77.1
<b>Monthly income (Saudi Riyals)</b>		
≤10,000	321	78.3
>10,000	89	21.7
<b>Number of pregnancies</b>		
I	108	26.3
>I	302	73.7

attitudes toward influenza vaccination in pregnancy were age ( $P<0.000$ ), educational level ( $P<0.015$ ), and number of pregnancies ( $P<0.0001$ ). Pregnant women below the mean age, who had a low educational level, and who were in their first pregnancy were significantly against it. Those with good knowledge about the influenza vaccine were more likely to have a positive attitude toward it ( $P<0.012$ ).

Furthermore, 80.2% did not receive the vaccine during pregnancy (Table 2). Poor uptake of the flu vaccine was significantly associated with being below the mean age ( $P<0.008$ ), having a low educational level ( $P<0.0001$ ), having a low income ( $P<0.0001$ ), and being unemployed ( $P<0.0001$ ), and participants with poor knowledge of the flu vaccine were significantly less likely to take the flu vaccine than those with good knowledge ( $P<0.001$ ). Only 36.6%

of all participants were ever offered the flu vaccine during pregnancy by a health care provider (Table 2). In addition, 52% of those who were offered the vaccine took it, while 98.8% of those who were not offered the vaccine did not take it. Pregnant women who were offered the flu vaccine were significantly more likely to take it than those who were not ( $P<0.001$ ).

Among the pregnant women who did not take the vaccine, the factor that most affected their uptake was that the flu vaccine has side effects (34%), as shown in Table 3. The factor that had the next biggest influence was that they were not offered the vaccine by their health care providers (Table 4).

## Discussion

The WHO recommends that all pregnant women receive the influenza vaccine for seasonal influenza, as they will most likely benefit from the vaccine and avoid complications.<sup>1</sup> The present study found that although more than half (57.1%) of pregnant women had good knowledge about influenza vaccine during pregnancy, only 19.8% took the vaccine.

Level of knowledge is not the only determinant for behavior; the largest barrier to influenza vaccine uptake during pregnancy was the participants' concern about the vaccine's safety and side effects (34%). More than half (67.6%) of those who stated other reasons (20.7%) did not take the flu vaccine because they were not offered the vaccine by a health care provider. These results are similar to those of a study in Italy, where only 9.7% of pregnant women were vaccinated against influenza and the largest barrier was that they were not offered the vaccine by a physician (34.9%).<sup>9</sup> This is in accordance with a previous study in the United States, where only 4% of pregnant women were vaccinated and 4% were offered the vaccine by a physician.<sup>10</sup> This may explain the low uptake of influenza vaccine during pregnancy.

In the previous study in Riyadh, Saudi Arabia, 18.1% of participants took the influenza vaccine during pregnancy but only 3% were offered the vaccine by a physician.<sup>8</sup> In the present study, 36.6% were offered the vaccine by a health care provider. This could be due to increasing awareness programs throughout the country over the past 5 years. This is an important point, as studies have shown that when health care providers recommend influenza vaccination directly, the likelihood of vaccine acceptance and receipt is much higher.<sup>11</sup> Furthermore, women who are concerned about vaccine safety still indicate that they would accept it if their health care provider recommended it.<sup>12</sup>

When administered according to the guidelines, the influenza vaccine is essential in protecting women and their offspring from the severity of influenza infection.<sup>13–15</sup> It is

**Table 2** Patients' responses to questions on knowledge, attitude, and uptake of influenza vaccine

Items (N=410)	Patients' response	
	Yes (%)	No (%)
<b>Knowledge of flu<sup>a</sup> vaccine</b>		
Flu infection is highly contagious	85.1*	14.9
Flu infection can sometimes be serious enough that a person must be admitted to the hospital	58*	42
Pregnant women are at a higher risk of flu complications than non-pregnant women	72.4*	27.6
Immunity decreases during pregnancy	83.7*	16.3
All pregnant women are advised to take the flu vaccine	56.1*	43.9
The flu vaccine is safe during pregnancy	60*	40
The flu vaccine can cause birth defects	22.2	77.8*
The flu vaccine can cause influenza	56.8	43.2*
Pregnant woman should avoid all types of vaccines	55.1	44.6*
Annual vaccination is the best way to protect from influenza	65.6*	34.4
Influenza vaccine is given in the winter	81*	19
<b>Attitude toward the flu vaccine</b>		
Are you against taking flu vaccine during pregnancy?	180 (43.9)	230 (56.1)
<b>Uptake of flu vaccine</b>		
Have you taken the flu vaccine during pregnancy?	81 (19.8)	329 (80.2)
<b>Whether the flu vaccine was offered by a health care provider</b>		
Have you ever been offered the flu vaccine during pregnancy?	150 (36.6)	260 (63.4)

**Note:** \*Correct answers of knowledge questions.

**Abbreviation:** Flu, influenza.

also cost-effective, as pregnant women who receive the vaccine have a lower risk of influenza attacks, clinic visits, hospitalization, and use of medication.

Along with previous research, our results suggest that a higher level of awareness and uptake of influenza vaccine during pregnancy could be achieved in Saudi Arabia by a change in behavior from health care providers.<sup>8</sup> Physicians should be trained to establish a holistic approach with their clients when offering influenza vaccine and directly address all their patients' behavioral determinants, such as knowledge, value, consequences, benefits, and other factors. More educational programs and campaigns for the public, in addition to social media marketing, could also increase the acceptance of the vaccine. In addition, a

mandatory policy that imposes influenza vaccine uptake to high-risk groups, including pregnant women, could be enacted to ensure that more pregnant women take the vaccine. Finally, further research regarding the uptake of influenza vaccination in pregnancy should be encouraged and supported by the Ministry of Health, universities, and other health organizations for educational purposes in Saudi Arabia.

This study had several limitations, including the use of a closed-ended questionnaire rather than focus group interviews or an open-ended questionnaire that would provide more in-depth information about the participants' opinions and knowledge. Furthermore, the scope of this study is

**Table 3** Factors affecting influenza vaccine uptake

Factors	Number of patients	%
The flu vaccine is not efficient	36	10.9
The flu vaccine has side effects	112	34.0
The flu vaccine is not safe in pregnancy	57	17.3
The flu vaccine is harmful to the fetus	56	17.0
Others	68	20.7
Total	329	100.0

**Table 4** Other factors affecting influenza vaccine uptake

Factors	Number of patients	%
Not offered the vaccine	46	67.6
No need	14	20.6
Not winter season	4	5.9
Psychological reasons	2	2.9
Will take when pregnancy follow-up is started	1	1.5
Not available	1	1.5
Total	68	100.0

limited to an eastern province in Saudi Arabia, and hence, the results may not be applicable to all geographical provinces in Saudi Arabia, nor worldwide.

## Conclusion

Although more than half of the participants had good knowledge about receiving the influenza vaccine during pregnancy, the uptake of the influenza vaccine was still low among the participants, due to the participants' concern about the safety of the vaccine and the rarity of its recommendation by the physicians. Clinical education for at-risk groups, the general public, and health care providers is necessary to raise the level of influenza vaccine awareness and utilization. A change in marketing methods and even public policy regarding the influenza vaccine may also be necessary.

## Data sharing statement

The data sets used during the current study are available from the corresponding author on reasonable request.

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## Disclosure

The authors report no conflicts of interest in this work.

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