

# Knowledge, attitude, and barriers of seasonal influenza vaccination among pregnant women visiting primary healthcare centers in Al-Ahsa, Saudi Arabia. 2019/2020

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## ABSTRACT

**Background:** The seasonal influenza vaccine is beneficial for both the pregnant women and their infants. It is considered as primary prevention for pregnant women and it decreases the serious outcomes when infection does occur. The present study was conducted to evaluate the knowledge, attitude, and barriers linked to uptake of seasonal influenza vaccine among pregnant women visiting primary healthcare centers (PHCs) in Al-Ahsa region of Saudi Arabia. **Methods:** A cross-sectional study done in Al-Ahsa with a target population of 410 Saudi pregnant women who attend antenatal care (ANC) clinics in PHCs in Al-Ahsa. The selection of participants was made by using multistage random sampling. A self-administered questionnaire was used as an instrument for data collection. **Results:** Two-thirds of the participants (66.1%) stated that they were not offered the flu vaccine by any doctor. Sixty percent of the participants (60.6%) show lack of knowledge regarding flu vaccine during pregnancy. One hundred and fifty-four of the participants (61.1%) have negative attitude toward the flu vaccine uptake during pregnancy. Concern regarding the side effects of the vaccine was the most mentioned barrier (80.9%). **Conclusions:** The uptake rate of influenza vaccine among pregnant women visiting Al-Ahsa PHCs is considerably low. In order to improve the uptake, we recommend increasing awareness among physicians working in PHCs of the importance of vaccination, enhancing the knowledge of women in childbearing age about influenza and its vaccine, and emphasizing the need to provide the influenza vaccine as part of routine ANC.

**Keywords:** Attitudes, knowledge of flu vaccine, pregnant women, Saudi Arabia, seasonal influenza vaccine

## Introduction

Seasonal influenza is one of the most common infectious diseases globally. Although it is a preventable infectious disease with mostly acute mild respiratory symptoms like fever, sore throat, rhinorrhea, muscle aches, headache, and cough, however, it can also lead to serious complications like pneumonia, acute

respiratory distress syndrome (ARDS), secondary bacterial infection, encephalopathy, and encephalitis.<sup>[1-4]</sup>

The global estimation of seasonal influenza by World Health Organization (WHO) is that 5–10% of adults and 20–30% of children acquire the infection every year.<sup>[1]</sup> The cumulative incidence in the kingdom of Saudi Arabia from January to December 2018 was 17.52 per 100,000 population. Unfortunately, there is no estimation of seasonal influenza among pregnant women.<sup>[5]</sup>

Pregnancy-associated immunological and physiological changes place women at greater risk for some infections and serious

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outcomes, such as infection with influenza viruses.<sup>[6]</sup> During the influenza pandemics of 1918, 1957, and 2009, pregnant women were at higher risk of adverse outcomes such as severe illness, hospital and intensive care unit admission, and death.<sup>[6]</sup>

There is a significant effect of both seasonal and pandemic influenza on the fetus and birth outcomes as well. Infection during pregnancy increases the risk for perinatal death, including abortion, stillbirths, and early neonatal morbidity and mortality. In addition, infection has been linked to increased risk of preterm, and often complicated delivery.<sup>[7]</sup>

Multiple preventive measures are known to prevent the spread of the infection, such as avoiding close contact with sick people, good hand hygiene, coverage of mouth and nose, and avoidance of touching the eyes, nose, or mouth. However, annual seasonal vaccination remains the most effective preventive method.<sup>[8]</sup>

According to 'The Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices' (ACIP) recommendations, all persons aged 6 months and older and have no contraindications should receive the Influenza vaccine annually. However, there are specific populations which are considered by the CDC to be of priority for vaccination against Influenza, because of their increased risk for severe illness, and development of Influenza-related complications. Among these high-risk groups are pregnant women, or women who are planning to be pregnant during the influenza season.<sup>[9]</sup>

The American College of Obstetricians and Gynecologists (ACOG) also recommends that women who are or will be pregnant during the Influenza season should be given the inactivated vaccine, and it can safely be given during any trimester.<sup>[10]</sup>

The seasonal influenza vaccine is beneficial for both the pregnant women and their infants. For pregnant women, the vaccine is considered the primary prevention and it decreases the serious outcome of influenza when infection does occur. The passive immunization by transmission of maternal antibodies to the fetus through the placenta is the best protective method for infants since the influenza vaccine is not licensed for children less than 6 months of age.<sup>[10,11]</sup>

In the post-2009 pandemic years, there was a notable rise in the number of articles discussing influenza vaccination when compared with the pre-2009 pandemic years.<sup>[12]</sup> A thorough literature review revealed that there was no single report conducted in Al-Ahsa about knowledge, attitude, and barriers linked to the uptake of seasonal influenza vaccine among pregnant women.

Zaraket *et al.* conducted a systemic review to examine the influenza vaccination status in the Eastern Mediterranean Region between 2006 and 2016. Most of the papers reviewed reported low uptake of vaccine among high risk populations. Inadequate level of knowledge and awareness are the major barriers to influenza vaccination.<sup>[12]</sup>

In Saudi Arabia, a cross-sectional study was conducted by Mayet *et al.* in the ANC clinic at King Khalid University Hospital in Riyadh in 2013. The knowledge of Saudi pregnant women, attitudes, beliefs, and factors associated with uptake of the influenza vaccination was evaluated using a face-to-face questionnaire. The results showed low knowledge and uptake of influenza vaccine. One quarter was against the vaccine during pregnancy. About 18% of pregnant women received the vaccine and only 13.1% considered the flu vaccine to be safe during pregnancy. Moreover, it was found that physicians rarely offer their patients the flu vaccine (3.0%).<sup>[13]</sup>

The goal of this study is to assess the level of knowledge, attitude, and barriers associated with uptake of seasonal influenza vaccine among Saudi pregnant women visiting primary healthcare centers (PHCs) in Al-Ahsa. Additional objectives were to measure the uptake rate of influenza vaccine and identify factors which are positively influencing influenza vaccine uptake.

## Methodology

This cross-sectional study was conducted among Saudi pregnant women who attended antenatal clinics (ANC) in PHCs in Al-Ahsa area, Eastern province, Ministry of health. Data were collected and analyzed from March 2019 to April 2020.

The inclusion criteria consisted of Saudi pregnant women following at PHCs. Non- Saudi non-pregnant women, women who were included in the pilot study, and pregnant women who followed up in very distant PHCs were excluded from the study.

According to the latest statistics, the number of pregnant women visiting the ANC clinics in PHCs in Al-Ahsa area, for the year 1439 was about 12,724 (after application of exclusion criteria). The sample confidence level used is 95% with confidence interval of 5%, and presumed prevalence of 50%, so the estimated sample size was 373, and to increase the response rate, an extra 10% was added which made the final sample size of 410 women. For calculation of sample size, Openepi, an epidemiologic calculator, was used.<sup>[14]</sup> According to the latest Ministry of Health (MOH) statistical yearbook,<sup>[15]</sup> there are 72 PHCs in Al-Ahsa area, and these are divided into three geographical sectors: Omran sector, Hofuf sector, and Mubarraz sector. The latest statistics on number of pregnant women served by each sector were obtained, and they were as follows: Omran sector served 47%, Hofuf sector served 32.8%, and Mubarraz sector served 20.2% of the population.

The sample was selected using multistage random sampling. The first stage of sampling was done using cluster sampling of PHCs within each sector. Sample size was allocated to each sector based on percentage of population it served. From each randomly selected PHC, the participants were allocated and non-randomly selected through convenience sampling.

Data was collected using a self-administered questionnaire. Modified validated questionnaires<sup>[16,17]</sup> were used. It was

composed of questions on demographic characteristics, previous vaccination history, knowledge about the influenza vaccine, attitude, and factors influencing vaccination and non-vaccination. It was translated into Arabic language, and the validity and reliability were tested through a Pilot Study.

After data collection, data was entered into a personal computer and analyzed using SPSS. All variables were coded before entry and were checked before analysis. Continuous data was presented in the form of mean, median, range, and standard deviation. Categorical data was presented in the form of frequency distributions and percentage. Relation between the dependent and independent variables was tested by *t*-test for continuous variables and Chi-square test for categorical variables. A *P* value of 0.05 or less was used as indicative of statistical significance.

A request letter for approval to conduct the research in Al-Ahsa PHCs was sent to Public Health Administration in General Directorate of Health Affairs in Al-Ahsa. The letter clarified the objectives of the study, the importance of the responses, as well as the assurance of confidentiality of the individuals participating in the study. The researcher explained to patients the study purpose and ensured the confidentiality of their own data. Ethical approval was obtained from the Institutional Review Board via letter No. 1420798/4/26/41 dated 13/03/2019 and informed written consent was taken from all participants in the study.

## Results

Of the 410 questionnaires that were distributed, 404 of them were completed, and 6 were discarded because they were incomplete, giving a response rate of 98.5%. The mean age of the participants was 29.37 years  $\pm$  6.17 standard deviation. Almost half of them (51.2%) were below 30 years of age. More than one half (57%) of participants had an educational level at university level and above. About two-thirds of the participants were unemployed (69%). Among employed participants, the majority were working in education (7.7%) and health (6.4%) fields. In addition, most of the participants (86.9%) did not have any chronic diseases. The details of the sociodemographic data are shown in Table 1.

The majority of participants (79.7%) did not take flu vaccine during pregnancy. Among those who have taken the vaccine, half of them (50%) took it in the current pregnancy. About two-thirds of the participants (66.8%) stated that they were not advised to take the flu vaccine by any doctor. Among those who were offered the flu vaccine by their physician, most of them (73.9%) were offered it by their obstetrician [Table 2].

The question that had the most correct answers was: "Flu viruses are most common during the fall and winter" with (84.4%). While the question with the least correct answers was: "Studies have shown that the flu vaccine can cause birth defects." with (25.7%). About 60% of the participants (60.6) showed lack of knowledge regarding influenza vaccine during pregnancy. The frequencies and percentages of correct and incorrect answers to questions about

knowledge of influenza and influenza vaccine among participants and knowledge score are shown in Table 3 and Table 4.

One hundred and fifty-four of the participants (61.1%) had negative attitude toward the flu vaccine uptake during pregnancy. Recommendation by the Ministry of Health carried the most positive influence on influenza vaccine uptake among pregnant women who have taken the vaccine (87.8%) [Table 5]. Concern about vaccine's side effects was the most mentioned barrier (81.2%), whereas forgetting was the least mentioned barrier (30.3%) [Table 6].

In relation to education, participants who have postgraduate degrees had significantly superior knowledge score ( $P = 0.0001$ ).

**Table 1: Socio-demographic variables of the study population**

Variable	Frequency	%
Age (Mean=29.37, Std. Deviation=6.169)		
<30 years	207	(51.2)
30 years and more	197	(48.2)
Education		
Primary	10	(2.5)
Intermediate	37	(9.2)
Secondary	127	(31.4)
College	218	(54)
Postgraduate	12	(3)
Occupation		
Student	61	(15.1)
Non-employee	278	(68.8)
Education	31	(7.7)
health field	26	(6.4)
Administrative	6	(1.5)
Other	2	(0.5)
History of chronic medical illness		
No	351	(86.9)
Yes	53	(13.1)

**Table 2: Status of Flu Vaccine Uptake during pregnancy**

	Frequency	(%)
Flu vaccine uptake during pregnancies		
No	322	(79.7)
Yes	82	(20.3)
When it was received		
Current	41	(50)
Previous	28	(34.1)
Both	13	(15.9)
Total	82	(100)
Offered the flu vaccine by any doctor		
No	270	(66.8)
Yes	134	(33.2)
Offered the flu vaccine by any doctor		
General Practitioner	20	(14.9)
Obstetric	99	(73.9)
Family medicine	6	(4.5)
Other	9	(6.7)
Total	134	(100)

**Table 3: Knowledge of influenza and influenza vaccine**

Knowledge items	Correct n (%)	Incorrect n (%)
Flu is highly contagious	272 (67.3)	132 (32.7)
Flu viruses are most common during the fall and winter.	341 (84.4)	63 (15.6)
Flu can sometimes be serious enough that a person needs to be admitted to the hospital.	212 (52.5)	192 (47.5)
The flu vaccine is safe in pregnancy.	162 (40.1)	242 (59.9)
The flu vaccine is safe during breastfeeding.	109 (27)	295 (73)
Pregnant women have the same risk of complications from the flu as women who are not pregnant.	124 (30.7)	280 (69.3)
Studies have shown that the flu vaccine can cause birth defects.	104 (25.7)	300 (74.3)

**Table 4: Level of knowledge**

	Frequency	Percentage
Low knowledge	245	60.6
High knowledge	159	39.4
Total	404	100.0

**Table 5: Factors positively influencing influenza vaccine uptake**

Factors	Answer	n=82 (%)
Effective	No	21 (25.6)
	Yes	56 (68.3)
Decreased transmission	No	32 (39)
	Yes	46 (56.1)
Ministry of Health recommendations	No	8 (9.8)
	Yes	71 (87.8)
Other causes	symptom	1 (1.2)

**Table 6: Barriers that prevent pregnant women from receiving the influenza vaccine**

Barriers	Answer	n	%
To avoid medications	Yes	312	77.2
	No	92	22.8
The flu is simple disease and no need for prevention by vaccine	Yes	261	64.6
	No	143	35.4
Concerned about vaccine's side effects	Yes	328	81.2
	No	75	18.6
Believe the vaccine is not effective	Yes	160	39.6
	No	244	60.4
The risk of acquiring flu disease is low	Yes	249	61.6
	No	155	38.4
Flu vaccine is not recommended to pregnant	Yes	169	41.8
	No	235	58.2
Fear of injection	Yes	164	40.6
	No	240	59.4
Forgetting	Yes	122	30.3
	No	282	69.8
The flu shot will make them sick	Yes	208	51.5
	No	196	48.5
Do not know from where they can get the vaccine	Yes	126	31.2
	No	278	68.8
Had bad experiences with previous flu vaccine	Yes	149	36.4
	No	255	63.1
It is not obligatory to get the flu vaccine	Yes	307	76
	No	97	24

In addition, participants who have jobs had significantly greater knowledge score ( $P = 0.0001$ ). Moreover, participants who work in health field in particular also had a significantly better knowledge score ( $P = 0.0001$ ) There was no significant relationship between knowledge and age or having chronic disease. [Table 7].

There was a significant relationship between vaccine uptake and good knowledge score. On the other hand, age, education, occupation, and history of chronic disease showed no significance. [Table 8] There was no significant association between gender, education, occupation, or chronic diseases and the attitude toward influenza vaccine.

The statistical test (Chi-square) was performed to compare the independent variables with the barriers to having the flu vaccine among respondents. Logistic regressions were done to statistically significant items [Tables 9-11]. There was a significant relationship between education and the following barriers: "avoid medications," "side effects," "flu shot will make them sick," and "bad experience" ( $P = 0.0001$ ,  $P = 0.031$ ,  $P = 0.009$ ,  $P = 0.002$ , respectively) [Table 9]. There is a significant relationship between occupation and the following barriers: "vaccine not being recommended," "fear of injection," "flu shot will make me sick," "do not know from where to get the vaccine," and "bad experience" ( $P = 0.029$ ,  $P = 0.022$ ,  $P = 0.007$ ,  $P = 0.024$ , and  $P = 0.009$ , respectively) [Table 10]. Not having any chronic disease had significant relationship with the following barriers: "side effects of vaccine," "chance of acquiring flu is low," "vaccine not recommended," and "not obligatory" ( $P = 0.035$ ,  $P = 0.022$ ,  $P = 0.029$ , and  $P = 0.016$ , respectively) [Table 11]. Otherwise, no statistically significant differences were found to barriers (the flu is simple disease), (concern regarding side effects of the vaccine) or (believe the vaccine is not effective) with participants' characteristics.

## Discussion

The current study was conducted to assess the knowledge, attitude, and barriers associated with uptake of seasonal influenza vaccine among pregnant women visiting PHCs in Al-Ahsa region of Saudi Arabia.

Most of the participants are in the reproductive age group as the mean age of our sample was 29.37 years. More than half (57%)

**Table 7: Relation between the demographic variables and the knowledge**

Variable	Poor Knowledge		Good Knowledge		Significance
	(n)	(%)	(n)	(%)	
Age					
<30 years	129	62.3	78	37.7	P 0.48
30 years and more	116	58.9	81	41.1	
Education					
Primary	8	80	2	20	P 0.0001
Intermediate	26	70.3	11	29.7	
Secondary	95	74.8	32	25.2	
College	110	50.5	108	49.5	
Postgraduate	6	50	6	50	
Occupation					
Student	35	57.4	26	42.6	P 0.0001
Non-employee	184	66.2	94	33.8	
Worker	26	40	39	60	
History of chronic medical illness					
No	212	60.4	139	39.6	P 0.796
Yes	33	62.3	20	37.7	

**Table 8: Vaccine uptake relation with demographics of the participants and knowledge score**

Variable	Vaccine taken		Vaccine not taken		Significance
	n	%	n	%	
Age					
<30 years	49	20.1	195	79.9	P 0.466
30 years and more	32	20	128	80	
Education					
Primary	1	10	9	90	P 0.873
Intermediate	10	27	27	73	
Secondary	27	21.3	100	78.7	
College	43	19.7	175	80.3	
Postgraduate	1	8.3	11	19.7	
Occupation					
Student	13	21.3	48	78.7	P 0.821
Nonemployee	58	20.9	220	79.1	
Worker	10	15.4	55	84.6	
Chronic disease					
No	66	18.8	285	81.2	P 0.257
Yes	15	28.3	38	71.7	
Knowledge score					
Good knowledge	49	30.8	110	69.2	P 0.0001
Poor knowledge	32	13.1	213	86.9	

of the participants' educational level was at university level and above, and this reflects that the majority of PHC patients in this age group are highly educated. Only a small percentage of the participants (13.1%) had a chronic disease and this was to be expected, since more than half of them were below 30 years of age.

Only (20.3%) of participants reported being vaccinated against influenza which is lower than the study conducted in New South Wales (27%) and Managua (42%).<sup>[18,19]</sup> However, similar studies done in Riyadh, Toronto, Shiraz, and Naples have shown a comparatively lower uptake rate of influenza vaccine.<sup>[13,16,20,21]</sup>

In our survey, 66.8% of all pregnant women were not offered the flu vaccine by any doctor during their pregnancy, which might be one of the possible explanations to not getting the vaccine. Another finding which validates this is the significant relationship shown between higher knowledge scores and vaccine uptake ( $P = 0.0001$ ). A similar result was reported in the Italy study, more than one third of those unvaccinated did not receive advice from their healthcare provider regarding vaccination.<sup>[21]</sup> This finding is in agreement with other studies done in Riyadh in Saudi Arabia Iran and Thailand also show a similar finding.<sup>[13,20,22]</sup>

Regarding the knowledge level of participants, about 60% of them (60.6%) had a poor knowledge score. This finding is likely to be another contributor to the low uptake rate. This is consistent with the Riyadh study (2013), which showed that most participants (63.9%) had a poor knowledge score.<sup>[13]</sup> Similarly, the studies done in Canada, Italy, and China had the same result of poor knowledge.<sup>[16,21,23]</sup>

The most misconception identified was that the flu vaccine can lead to birth defects. Same result was found in the Canada study, 80% of pregnant women incorrectly believed that the vaccine can lead to birth defects.<sup>[24]</sup>

In our study, participants who work in health field and those who have postgraduate degree had a significantly superior knowledge score ( $P = 0.0001$ ). This finding may be because their chances of exposure to knowledge about influenza and its vaccine are higher than others.

As most of participants had poor knowledge, more than half of them (61.1%) had a negative attitude toward vaccination during pregnancy.

**Table 9: Logistic regression for level of education affecting barriers to having influenza vaccine**

Variable	Yes Number (%)		No Number (%)		Chi-square	Significance
	n	%	n	%		
To avoid medications						
Primary	10	(100)	0	(0)	21.151	P 0.001
Intermediate	21	(56.7)	16	(43.2)		
Secondary	96	(75.5)	31	(24.4)		
College	180	(82.1)	39	(17.8)		
Postgraduate	6	(50)	6	(50)		
Concerned about vaccine's side effects						
Primary	7	(70)	3	(30)	10.64	P 0.031
Intermediate	24	(64.9)	13	(35.1)		
Secondary	99	(77.9)	28	(22)		
College	186	(85.3)	32	(14.6)		
Postgraduate	11	(91.6)	1	(08.4)		
The flu shot will make them sick						
Primary	5	(50)	5	(50)	13.417	P 0.009
Intermediate	12	(32.4)	25	(67.6)		
Secondary	56	(44.1)	71	(55.9)		
College	127	(58.3)	91	(41.7)		
postgraduate	8	(66.6)	4	(33.3)		
Had bad experiences with previous flu vaccine						
Primary	7	(70)	3	(30)	19.806	P 0.002
Intermediate	9	(24.3)	28	(75.6)		
Secondary	32	(25.2)	95	(74.8)		
College	96	(44.1)	122	(55.9)		
postgraduate	4	(33.3)	8	(66.6)		

**Table 10: Logistic regression of occupations affecting barriers to having influenza vaccine**

Variable	Yes		No		Chi-square	Significance
	n	%	n	%		
Flu vaccine is not recommended to pregnant						
Student	35	57.4	26	42.6	7.047	P 0.029
Non-employee	110	39.6	168	60.4		
Worker	24	36.9	41	63.1		
Fear of injection						
Student	34	55.7	27	44.3	7.61	P 0.022
Non-employee	102	36.7	176	63.3		
Worker	28	43.1	37	56.9		
The flu shot will make them sick						
Student	36	59.1	25	40.9	9.986	P 0.007
Non-employee	129	46.4	149	55.6		
Worker	43	66.2	22	33.8		
Do not know from where they can get the vaccine						
Student	27	44.3	34	55.7	7.645	P 0.024
Non-employee	85	30.6	193	69.4		
Worker	14	21.5	51	78.5		
Had bad experiences with previous flu vaccine						
Student	28	45.9	33	54.1	9.513	P 0.009
Non-employee	88	31.7	190	68.3		
Worker	32	49.2	33	50.7		

People who had positive attitude toward the vaccine mention recommendation of the vaccine by the ministry of health as having the most influence on them.

The barriers believed by the participants to prevent vaccine uptake were variable. The most common barrier encountered was concern

about vaccine's side effects (81.2%). Other reported barriers were a desire to avoid medication, the fact that the Ministry of Health has not made vaccination obligatory, the belief that the vaccine is ineffective, the belief that the flu is a simple disease, fear of injection, and least one was forgetting. Our findings were in line with several previous studies in different countries.<sup>[13,21,23]</sup>

**Table 11: Logistic regression of history of chronic disease affecting barriers to having influenza vaccine**

	Yes		No		Chi-square	Significance
	n	%	n	%		
Concerned about vaccine's side effects						
Yes	37	69.8	16	30.1	4.429	P 0.035
No	290	82.6	61	17.4		
The risk of acquiring flu disease is low						
Yes	25	47.1	28	52.8	5.255	P 0.022
No	223	63.5	128	35.5		
Flu vaccine is not recommended to pregnant						
Yes	16	30.2	37	69.8	4.77	P 0.029
No	153	43.6	198	56.4		
It is not obligatory to get the flu vaccine						
Yes	33	62.3	20	37.7	5.781	P 0.016
No	274	78.1	77	21.9		

For example, China study indicated that unvaccinated women reported a variety of reasons for not taking the vaccine including worries that the vaccine can cause a person to get sick with influenza (17.7%), 16% of them reported that it is not an effective way to prevent a pregnant woman from acquiring the infection, and 14.9% of them worried that it is not safe during pregnancy.<sup>[23]</sup>

### Study Limitations

This is a cross-sectional study, so it has limitation in evaluating temporality and causality of the observed relationship.

The other limitation is that this research only covers those visiting PHCs. It doesn't include those following up in hospitals. So, it may not represent Al-Ahsa Saudi women in general.

### Conclusion and Recommendations

From this study, it was found that uptake rate of influenza vaccine among pregnant women visiting Al-Ahsa PHCs is considerably low. The leading cause of that was demonstrated to be the vaccine not being offered to pregnant women by their physicians, along with an inadequate level of knowledge on influenza and its vaccine among pregnant women. As preventive services are an essential part of the comprehensive care provided by the primary care physician, we delineate in this study the importance of family physicians' roles in increasing vaccination rates.

In order to improve the rate of vaccination among pregnant women, we make the following recommendations:

1. Increase awareness among physicians working in PHCs of the importance of influenza vaccination.
2. Work on enhancing the knowledge of women in childbearing age about influenza and its vaccine. Some examples of efforts that could be made to improve knowledge include health education during the clinical visit, making use of social media to increase awareness, use of pamphlets and brochures, and health education campaigns.

3. Emphasize the need to provide the influenza vaccine as part of routine antenatal care.

### Key messages

1. Despite proven importance of influenza vaccination for pregnant women, vaccination rates remain low in PHCs in Al-Ahsa.
2. Main obstacles against vaccination are lack of knowledge among pregnant women, and vaccine not being offered to them.
3. Efforts to improve vaccine uptake include health education and increasing physicians' awareness.

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### Conflicts of interest

There are no conflicts of interest.

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