Original article

Knowledge and practice about influenza vaccination and compliance with influenza immunization among pregnant women in Sari, 2013

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Abstract

Background and Purpose: Pregnant women are at a higher risk of influenza infection, and influenza vaccination is recommended for these women to reduce the associated complications. This study aimed to determine the knowledge and practice about influenza vaccination and identify the factors influencing compliance with influenza immunization among pregnant women.

Methods: This cross-sectional study was conducted on 384 pregnant women referring to six health care centers and six obstetric clinics in 2013 in Sari, Mazandaran, Iran. After the random selection of health care centers, samples were collected using convenience sampling. The objectives of the study were explained to the participants, and questionnaires were completed on the demographic characteristics, knowledge and practice in influenza vaccination. Data analysis was performed using frequency, mean, standard deviation, Chi-square test, Friedman test and T-test in SPSS V.14.

Results: In this study, general knowledge of pregnant women about influenza vaccination was relatively poor. Approximately 31% of the studied subjects had low awareness, while 52% and 18% had moderate and high levels of knowledge about influenza immunization. In addition, rate of influenza vaccination was estimated at 5.5%, and the most common reason for avoiding vaccination during pregnancy was the concern about the possible risks of the vaccine for the fetus (34.9%).

Conclusion: According to the results of this study, pregnant women are not adequately informed about influenza vaccination and its benefits; therefore, the overall rate of influenza vaccination is low. In this regard, educational programs on influenza complications, benefits of maternal vaccination and vaccine safety should be implemented for pregnant women by health professionals.

Keywords: Immunization, Influenza, Influenza Vaccine, Knowledge, Practice, Pregnant Women

Introduction

Influenza is an acute respiratory infection and a major cause of complications and mortality in winter (1). This illness mostly affects the upper and lower respiratory systems with different viruses and is easily transmissible (2). Complications caused by influenza tend to be more severe in pregnant women. Incidentally, the immunological and physiological changes in the respiratory and cardiovascular systems and other body organs during pregnancy make these women vulnerable to influenza complications (3, 4).

According to statistics, pregnant women are at a higher risk of mortality, severe complications and hospitalization in intensive care units (ICUs). Moreover, the risk of stillbirth, mortality within the first week of birth, prematurity, low birth weight and small-for-gestational-age is noticeably higher in the infants of the mothers infected by influenza during pregnancy (5). In this regard, the mortality rate among pregnant women during the influenza pandemic in 1918-1957 was reported to be between 20-50% (6).

In the United States, the H1N1 influenza pandemic

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in 2009 was reported to affect the population of pregnant women significantly. Although these individuals accounted for only 1% of the total population, the mortality rate was estimated at 5% during April-August 2009 among these women (7,8). According to the statistics in Iran, 3.8% of the overall mortality rate in 2009 was attributed to the transmission of influenza A virus (9). In a study by Gooya et al., during the H1N1 influenza pandemic in Iran, only 33 out of 830 infected cases were pregnant, none of whom died in this period (10). Unfortunately, no official data could be found on the maternal mortality rate due to influenza in Iran (11).

Influenza vaccination is considered as the most effective measure to prevent influenza infection and the associated complications (12,13). Maternal vaccination against influenza is essential to having a safe pregnancy. Furthermore, it is a beneficial strategy as to protect women against other infections during pregnancy and the postpartum period. This method of immunization could protect neonates within the first six weeks of birth, as the most critical period of their life (14). In one study by Richards et al., vaccination was proposed as an economical health measure (15). Additionally, the American College of Obstetricians and Gynecologists has recommended trivalent inactivated influenza vaccine since 2004, regardless of the gestational age during pregnancy (16).

The Iranian Ministry of Health has also emphasized that women whose pregnancies coincide with cold seasons need to be vaccinated against influenza (11). Prescription of inactivated influenza vaccine has been advised for all pregnant women, and cumulative evidence confirms the protective effects of this vaccine on both the mother and infant. Nevertheless, the use of this immunization method is relatively low (rarely higher than 15%) among pregnant women (17-19).

In a study conducted by Mehary et al., inadequate knowledge of mothers about influenza vaccination was found to be a significant barrier in the implementation of necessary immunizations (14). Among other barriers are concerns about the maternal and neonatal safety, misunderstanding of the importance of vaccination, unavailability of the vaccines and negligence of health care providers in endorsing influenza vaccination (14, 20).

According to several studies, vaccination is the most effective approach in the prevention of complications caused by influenza during pregnancy. Therefore, awareness should be raised among pregnant women to encourage influenza vaccination. To this end, we need to determine the state of knowledge among these individuals and plan new strategies to enhance it. Improvement of knowledge results in increased tendency towards vaccination, which could remarkably decrease the adverse pregnancy and delivery outcomes, while enhancing maternal health during pregnancy.

Pregnant women need accurate information regarding health behaviors associated with the prevention and treatment of influenza. Thus, it is of paramount importance to measure the knowledge and performance of these women and distinguish reliable resources from misinformation in this regard (8).

Despite the corroborative recommendations of the World Health Organization (WHO) with respect to the vaccination of pregnant women in Iran, the exact number of vaccinated pregnancies is unclear. This study aimed to determine the knowledge and performance of pregnant women, as well as the reasons for their compliance with influenza immunization.

Materials and Methods

This cross-sectional study was conducted during January-March 2013 on a population of pregnant women in Sari, located in Mazandaran province, Iran. Samples included pregnant women with the gestational age of 36-40 weeks, who had basic reading and writing skills. Simple randomized sampling was performed in six obstetric clinics and six health care centers in Sari, and the samples were selected according to the inclusion criteria using convenience sampling.

The total sample size was calculated to be 384 subjects based on the Krejcie and Morgan table considering the similarities between the study populations. Data collection was performed using

demographic questionnaires (age, education status, income status, obstetric characteristics and influenza-related factors). In addition, another questionnaire with 12 items was used for inspecting the reasons of non-compliance with vaccination among the subjects.

State of knowledge in the pregnant women was evaluated using a 5-point Likert scale, including 10 questions with the score range of 0-25. The items in the performance section of this test focus on the prevention of influenza infection (seven questions), which are answered with "Yes" or "No". The survey was a modified version of the questions used in previous studies (2,21).

Content and face validity of the questionnaires was approved by six obstetric experts, and the test-retest technique was used to determine the reliability of the questionnaire (r=0.85). Moreover, interview forms were completed by 40 subjects with a one-week interval, and the correlations and reliability of the responses were approved by the researchers. Objectives of the study were explained to the participants, and each subject was interviewed in a private setting. In addition, informed consent was obtained from all the participants prior to the study.

Data analysis was performed using frequency, mean, standard deviation, Chi-square test, Friedman test and T-test in SPSS V.14. The study protocol was approved by the research council of Azad University of Sari, Mazandaran, Iran.

Results

In this study, the mean gestational age of the subjects was 37.84±0.81 weeks. Demographic characteristics of the participants are presented in Table 1. Approximately 10.9% of the subjects had anemia, only 9.9% had been advised on vaccination by a physician or midwife, and 77.6% did not mention any such recommendations. Other subjects had no memory of receiving recommendations on influenza immunization.

In total, 21 subjects (5.5%) had been vaccinated during pregnancy, and the majority of vaccinations were performed between late August and late September. Among the participants, 15 and 7 cases were immunized before and during pregnancy, respectively. Moreover, eight, nine, one and three mothers had purchased the vaccine from private clinics, drugstores, hospitals and other places, respectively. Amongst them, four subjects manifested flu-like symptoms two weeks after the vaccination.

Table 1. Comparison of Knowledge and Practice Based on Demographic and Obstetric Characteristics in Pregnant Women referring to Health Care Centers and Obstetric Clinics of Sari (2013)

Variables	Number (%)	Knowledge Level (Low, Moderate, High)	P value	Practice Level (Positive, Negative)	P value
Health Care Facility					
Health Care Center	195 (50.80)	38 (19.5), 119 (61), 38 (19.5)	0.99	157 (80.5), 38 (19.5)	0.68
Obstetric Clinic	189 (49.2)	36 (19) , 116 (61.4), 37 (19.6)		149 (78.8), 40 (21.2)	
Age (Years)					
<20	25(3.8)	4 (6), 19 (76), 32 (18)	0.2	21 (84), 4 (16)	0.5
21-25	143 (40)	25 (18), 90 (62.9), 26 (19.1)		110 (77), 33 (23)	
25-30	139 (36.1)	34 (24.4), 76 (55.1), 29 (20.5)		116 (83.5), 23 (16.5)	
>30	77 (20.1)	57 (13), 47 (63), 23 (24)		60 (77.8), 17 (22.2)	
Number of Pregnancy					
First	269 (70.1)	53 (19.7), 165 (61.3), 51 (19)	0.59	211 (78.4), 58 (21.6)	0.59
Second	100 (26)	19 (19), 61 (61), 20 (20)		82 (82),18 (18)	
Third	15 (3.9)	2 (13.3), 9 (60), 4 (26.7)		13 (86.7), 2 (13.3)	
Education Status					
Primary School	5 (1.3)	0 (0), 5 (100), 0 (0)	0.15	4 (80), 1 (20)	0.18
Secondary School	25 (6.5)	8 (32), 15 (60), 2 (8)		19 (76), 6 (24)	
High School	194 (50.5)	33 (17),116 (59.8), 45 (23.2)		147 (75.8), 47 (24.2)	
Academic	160 (41.7)	33 (20.6), 99 (61.9), 28 (17.5)		136 (85), 24 (1)	
Average Income					
Inadequate	41(10.9)	9 (19.5), 21 (53), 11 (27.5)	0.17	20 (47), 21 (53)	0.1
Adequate	337 (87.8)	31 (9.1), 212 (62.9), 94 (28)		134 (39.7), 203 (60.3)	
High	5 (1.3)	1 (20), 3 (60),1 (20)		2 (40), 3 (60)	

Table 2. Reasons for Rejection of Influenza Vaccination in Pregnant Women referring to Health Care Centers and Obstetric Clinics of Sari (2013)

Reasons (Negative Attitude)	**Frequency**	**%**
I do not think I would be infected with influenza and become severely ill	55	14.3
I think that in case of infection, I would recover by taking medicines	76	19.8
Vaccination risks for the fetus concern me	134	34.9
Vaccination risks to me concern me	1	0.3
I do no think the vaccine is effective in preventing influenza	19	4.9
I am afraid of injection	4	1
I am afraid of getting influenza after the injection	2	0.5
I am not sure what to do	55	14.3
Other Reasons	Frequency	%
Physician, midwife or other health care providers warned me about risks of using the vaccine	5	1.3
I do not have time for vaccination	2	0.5
The vaccine is expensive	2	0.5
I do not know where to get the vaccine	5	1.3
The vaccine was not available in drug stores	2	0.5

In the present study, the main reason for avoiding vaccination was the concern about the possible risks for the fetus (34.9%) (Table 2). In addition, our findings indicated that 50.3% of the mothers had concerns about seasonal influenza, and 26.8% experienced influenza infection during pregnancy. With respect to the state of knowledge about influenza vaccination in the study population, the mean score was estimated at 13.5±2.23 out of 25.

According to the further results of this study, 152 subjects (39.5%) had negative attitudes and 232 (60.5%) had positive attitudes towards influenza immunization. No significant difference was observed between the general inclination toward vaccination and the education status, income status, health care facility, number of pregnancy and gestational age among the studied subjects. However, women under 20 years of age were observed to have a more negative attitude towards vaccination compared to other subjects; in this age group, 56% of the women had a negative attitude towards immunization, while 44% had a positive attitude.

The state of knowledge was more notable in the pregnant women who were previously vaccinated against influenza during pregnancy (P=0.000). Among these subjects, 4.8%, 23.8% and 71.4% had low, moderate and high levels of knowledge about influenza vaccination. As for the women who had not received vaccination, 16.3%,63.4% and 20.4% were observed to have low, moderate and high levels of knowledge. Furthermore, the attitude of the subjects who had previously been immunized against influenza was more positive compared to those who had not been vaccinated before (P=0.000).

All the vaccinated women in this study had a positive attitude towards influenza immunization

Table 3. General Opinions about Influenza Vaccination in Pregnant Women referring to Health Care Centers and Obstetric Clinics of Sari (2013)

General Opinions	**Number (%)**			
	Strongly Agreed	Partially Agreed	Strongly Disagreed	Do Not Know
Flu shot is safe for mothers	38 (9.9%)	56 (40.6)	72 (18.8)	118 (30.7)
Flu shot protects mothers against infection	93 (24.2%)	197 (51.3)	2 (0.5)	92 (24)
Flu shot is necessary if the infection is severe	24 (6.2%)	279 (72.6)	80 (20.9)	1 (0.3)
Dosage of flu shot given to pregnant women does not harm fetus	27 (7%)	141 (36.7)	82 (21.4)	134 (34.9)
All pregnant women need flu shot in influenza season	44(1.5%)	98 (25.6)	25 (6.4)	217 (56.5)
Flu may harm fetus	25 (6.5%)	282 (73.4)	37 (9.7)	40 (10.4)
Flu shot protects infant within the first few months of birth	9 (2.3%)	268 (69.8)	99 (25.8)	8 (2.1)

(100%), while 41.9% and 58.1% of the women who had not been vaccinated harbored negative and positive attitudes towards immunization, respectively. Comparison of the state of knowledge and practice based on the demographic and obstetric characteristics of the participants is shown in Table 1.

In the present study, the majority of the mothers (51.8%) reported moderate influenza infection during their pregnancy. General opinions of the studied subjects about influenza vaccination are shown in Table 3.

In this study, Friedman test was used to evaluate the protective measures taken by the subjects against influenza infection, as well as to determine the differences between the performances of the mothers. According to the results, the major protective measures used by the mothers were as follows:

1) Avoiding influenza-infected people (5.22%), frequent hand washing or using disinfectants (5.04%), avoiding touching the eyes, nose or mouth (4.13%), spending limited time in crowded places (3.76%), avoiding contact with people outside of the family (3.59%), using facial masks (3.47%) and using antiviral drugs (2.78%).

2) Among the studied subjects, the most reliable sources of mother-child health information were reported to be gynecologists (77.1%), midwives (55.2%) and family physicians (31.8%).

Discussion

Several studies have indicated that pregnant women are at a higher risk of influenza infection and the associated complications (1,3,4), and influenza vaccination has been recommended as the most effective measure to prevent these complications (12,13).

The findings of the present study support the efficacy of maternal influenza vaccination reported by previous studies; however, there are some differences between the results. In our study, investigation of the state of knowledge on influenza immunization indicated that the general knowledge among the pregnant women was lower than the reported rates by previous studies (22,23). This could be due to the lack of education offered by health care providers before and during pregnancy.

Among the subjects of the present study, only 9.9% were advised on influenza immunization by the health care providers. In a similar study by Yudin et al. in Canada, 19% of the mothers were recommended for influenza vaccination and this rate was reported to be 22% in the study conducted by Silverman (21,23).

The results of another research conducted on the same subject indicated that only 39% of the gynecologists and midwives recommended influenza vaccination for pregnant women (24). This could be due to the poor awareness among these specialists.

Health professionals, especially physicians and midwives, need to be aware of the most recent international guidelines regarding influenza prevention in order to encourage pregnant women to receive vaccination during routine prenatal cares. In the current study, only 5.5% of the mothers had received the influenza vaccine, while in another study performed in Iran, 6% of the pregnant women had received influenza immunization (11).

In a study by Tong et al. (2008) in Toronto, rate of influenza vaccination was reported to be 14% among pregnant women. In another study conducted by Silverman, only 8% of the mothers had received influenza immunization (21,22). This difference could be due to the strategies applied in our country. In Iran, only high-risk pregnant women are advised on influenza vaccination, while in other countries, all pregnant women are encouraged to receive influenza immunization during pregnancy.

In the present study, the majority of the mothers had a negative attitude towards influenza vaccination due to the fear of possible risks for the fetus. Other reasons in this regard included needle phobia, high cost of the vaccine, lack of time and unavailability of the vaccine.

According to the results obtained by Pamela et al. (2013), the most common reasons for the unwillingness towards influenza immunization were inadequate knowledge about influenza vaccine, concerns about the risks of the vaccine for the fetus and lack of recommendation for the vaccine by health

care providers (16). In the study conducted by Yudin et al., the most important cause of vaccine rejection was reported to be the mothers' concern about the possible risks of vaccination for the fetus (23).

According to the other results of our study, younger women had a more negative attitude towards influenza vaccination, while the women who had previously received immunization had a more positive attitude.

On the other hand, the pregnant women who were previously vaccinated against influenza had a better knowledge of this immunization measure compared to those who were not vaccinated before. Furthermore, factors such as the health care facility, age, education status, income status, gestational age and number of pregnancy had no significant effects on the state of knowledge and practice in the pregnant women. Therefore, it could be concluded that the women who were aware of the advantages of influenza vaccination, as well as those who were not concerned about the possible side effects, were more willing to receive the immunization during pregnancy.

According to the results of this study, general knowledge of pregnant women about influenza vaccination and its advantages was relatively poor. The main barriers against the persistent implementation of influenza immunization during pregnancy were as follows:

-Lack of awareness on the safety of influenza vaccination during pregnancy

-Lack of medical endorsement by health care providers

-Unawareness of the advantages and consequences of influenza vaccination for the mother and infant

-Negative attitude of pregnant women towards influenza vaccination

In this regard, the following solutions could be taken into account:

-Enhancing the knowledge of pregnant women about the benefits of vaccination for the mother and infant through educational programs for the mothers

-Updating the knowledge of health professionals through educational programs

-Affirmative recommendations for influenza vaccination in pregnant women during maternal visits by specialists

Considering the limited knowledge of mothers about the advantages of influenza vaccination during pregnancy, health care providers play a pivotal role in the prevention of influenza among these women through applying vaccination, treatment, and infection control methods. In this regard, international guidelines of influenza vaccination need to become essential parts of routine pregnancy care in order to improve mother-infant health.

The current research had several limitations; such example is the presence of information recall bias. Additionally, the present study was performed within the last weeks of pregnancy in the selected subjects, and the main sources of information about pregnancy complications were the self-reports provided by the subjects.

Conflicts of Interest

None declared.

Author's Contributions

Elieh Abasi was responsible for the study conception and design. Tahmasebi and Tofighi participated in the process of data collection. Zafari helped in the process of analyzing the data.

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