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KNOWLEDGE, ATTITUDES AND BEHAVIOR OF PHYSICIANS TOWARDS INFLUENZA INFECTION AND VACCINATION DURING PREGNANCY

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Abstract

Objectives: In our study, we aimed to determine the knowledge, attitudes and behaviors of Family Physicians (FP) and obstetrics and gynecology (OB-GYN) physicians about influenza infection during pregnancy and the influenza vaccine administered during pregnancy, as well as the factors that influence them.

Materials and Methods: This descriptive cross-sectional study included 419 OB-GYN and FP practicing in Istanbul between November 15, 2017, and March 15, 2018. A 14-item survey was administered face-to-face to assess sociodemographic factors, influenza vaccination recommendation status, and knowledge level regarding influenza infection and vaccination.

Results: A total of 11.48% of the participants themselves had been vaccinated against influenza during pregnancy, and 48.68% of the participants recommended influenza vaccination during pregnancy. There was a statistically significant difference between vaccination recommendation status ($p=0.014$) and age ($p=0.014$), the institution of employment ($p=0.002$), specialty ($p=0.008$), having received the influenza vaccine during pregnancy ($p<0.001$), and find it beneficial to include pregnant women in the risk group for influenza vaccination ($p<0.001$). The independent variables of knowledge regarding influenza infection and vaccination during pregnancy (OR=2.60, $p=0.034$) and survey total score (OR=1.36, $p<0.001$) were found to be significantly associated based on the results of a multiple logistic regression analysis of influenza vaccine recommendation.

Conclusion: The knowledge and awareness of physicians should be improved to increase influenza vaccination rates during pregnancy. Furthermore, incorporating influenza vaccines into the standard maternal immunization schedule might help in increasing the vaccination rates.

Keywords: Influenza, pregnancy, vaccination.

Introduction

The influenza virus causes a highly contagious respiratory illness known as seasonal flu. The illness typically has a self-limiting clinical course, with symptoms improving within a week without medical treatment. However, it also has the potential to cause significant illness or death, particularly in those who are at high risk. Seasonal influenza epidemics are estimated to cause serious illness in 3–5 million people and the death of 290,000–650,000 people each year around the world.[1] Pregnant women are at higher risk than the general population for influenza-related complications, including higher rates of hospitalization and fetal and maternal death.[2] Hence, the vaccination of pregnant women against influenza has become a common practice in recent years to protect the mother and fetus from seasonal influenza infection.[3] The World Health Organization's Vaccine Experts Strategic Advisory Group reported in 2012 that pregnant women were given the highest priority for receiving seasonal influenza vaccination.[4] Similarly, various national and international organizations recommend a single dose of influenza vaccine in any trimester of pregnancy.[5-7] Influenza vaccination is recommended by the Turkish Ministry of Health for people aged ≥65 years, those with chronic diseases, healthcare workers and pregnant women in their second and third trimesters, with the expense of the vaccination reimbursed.[8] The advice of healthcare professionals is effective in vaccination acceptance during pregnancy.[9] In Turkey, physicians that are specialized in family medicine (FM) and specialized in obstetrics and gynecology (OB-GYN) perform pregnant women's follow-ups.[9]

Our study aimed to investigate FM and OB-GYN physicians' knowledge, attitudes and behaviors toward vaccination and influenza infection during pregnancy, as well as the factors that influence them.

Materials and Methods

This descriptive cross-sectional study was conducted between November 15, 2017, and March 15, 2018. The study population was determined as FM and OB-GYN physicians practicing in Istanbul (N = 13,575). The sample size was calculated as 378 at a 95% confidence interval (n = 378). A total of 419 physicians participated in the study voluntarily. Ethical approval was obtained from the local ethics committee.

Data collection tools

The survey used in the study was developed by a pediatrician and a family physician, considering the information in recent medical articles. The survey included multiple-choice, closed-ended and semi-closed-ended questions. The participants only gave one answer to the questions regarding their knowledge about influenza infection and vaccination, such as "I agree," "I disagree," or "I do not have an opinion." The

participants' responses to the survey questions were evaluated and coded as "1 = True" or "0 = False/I do not know." The total survey score was calculated by summing the scores obtained through this coding.

Statistical analysis

IBM SPSS 25.0 program (SPSS Inc. Chicago, Illinois, USA) was used for statistical analysis. Frequency tables and graphs were used to present descriptive statistics regarding the participants' sociodemographic information. In addition, the Cronbach's α reliability coefficient was determined using the participants' minimum, maximum, and average survey scores.

As there were more than 200 participants in the study, parametric tests were used in the analysis.[10] The independent samples test and one-way analysis of variance were used to determine whether there was a significant difference between the independent variables and the total survey score. When there was a significant difference between the groups, we performed a post-hoc test to determine the significance between the groups. Sidak post-hoc test was preferred as the variance was homogeneously distributed and the sample sizes were unequal.[11] Chi-square test was used to compare categorical variables, and a multivariate logistic regression analysis was performed to determine the factors predicting influenza vaccine recommendation during pregnancy. Statistical significance was defined as $p<0.05$.

Results

The study initially included 444 physicians; however, 25 of them were excluded due to incomplete surveys. Thus, the study was conducted with 419 physicians who completed the survey in its entirety, with 364 being FM (86.88%) and 55 being OB-GYN (13.12%) physicians. The sociodemographic characteristics of the participants are shown in Table 1.

The reliability analysis of the knowledge survey showed that the Cronbach's α internal consistency coefficient for the items was 0.76. A Cronbach α level above the 0.70 limit indicates that the internal consistency of the survey is adequate.[12] Therefore, the internal consistency of the survey in this study was considered to be adequate. The mean score obtained by the participants from the survey was 4.25±2.04 (min=0, max=7). Table 2 depicts the frequency distributions of the participants' "true" and "false/I do not know" responses to the survey items.

Table 1. Sociodemographic data of participants (n= 419)

Demographic variables	n or X_{mean} (min–max)	% or Mean ± SD
Age (Years)	39.00 (24.00–64.00)	39.55 ± 8.14
20–30 years	55	13.13
31–40 years	178	42.48
41–50 years	142	33.89
>50 years	44	10.50
Sex		
Male	117	27.93
Female	302	72.07
Marital Status		
Single	70	16,71
Married	349	83.29
Institution of Employment		
Primary healthcare	312	74.47
Secondary healthcare	46	10.97
Tertiary healthcare	61	14.56
Duration of practice (Years)	11.00 (1.00–38.00)	13.63 ± 8.61
Specialty		
Family medicine	364	86.88
Obstetrics and Gynecology	55	13.12
Have you or has your partner had the influenza vaccine during pregnancy?		
No	339	88.52
Yes	44	11.48
How many pregnant women do you follow on average per month?	20.00 (0.00–2000.000)	59.37 ± 192.57
Do you recommend influenza vaccination during pregnancy?		
No	215	51.32
Yes	204	48.68
If the answer is no, why not suggest it? (n = 298) *		
a) I do not recommend it because it is not in our standard maternal immunization schedule.	117	39.27
b) I do not have sufficient knowledge about influenza vaccination for pregnant women.	99	33.23
c) I do not recommend it due to its side effects.	32	10.73
d) I do not believe in its protective effects.	43	14.42
e) Pregnant women should not be vaccinated.	7	2.35
What is your opinion about the Ministry of Health's recommendation for influenza vaccination by placing pregnant women in the risk group? (n = 414)		
Beneficial	237	57.25
No opinion	77	18.60
I do not find it necessary	100	24.15
Did you receive information regarding influenza infection and vaccination during pregnancy?		
No	337	80.43
Yes	82	19.57
Where did you receive information about influenza infection and influenza vaccination during pregnancy? (n = 217)*		
Scientific conventions and meetings	69	31.80
Colleagues	47	21.66
Company meetings	11	5.07
Company representatives	10	4.61
Scientific articles	60	27.65
Other	20	9.21

(*n exceeds the sample size as the answers include multiple responses.)
(SD: Standard deviation)

Table 2. Frequency distribution of participants' responses to the items of the information survey (n = 419)

Survey items		n	%
1- Influenza vaccination during pregnancy protects the baby from influenza infection in the first six months after birth.	False/I do not know	279	66.58
	True	140	33.42
2- Compared to the general population, complications and mortality in influenza infection during pregnancy increased.	False/I do not know	131	31.26
	True	288	68.74
3- The efficacy of the influenza vaccine in pregnant women ranges from 54% to 89%.	False/I do not know	268	63.96
	True	151	36.04
4- The symptoms of influenza (fever, runny nose, myalgia, headache, and sore throat) are the same during pregnancy.	False/I do not know	84	20.04
	True	335	79.06
5- Nausea, vomiting, and hydration-resistant tachycardia are more common in influenza infection in pregnant women.	False/I do not know	148	35.32
	True	271	64.68
6- The hospitalization period is extended when influenza infection-related complications develop in pregnant women.	False/I do not know	80	19.09
	True	339	80.91
7- Influenza infection can be diagnosed in pregnant women based on clinical findings.	False/I do not know	159	37.94
	True	260	62.06

The results of the analysis comparing several variables with the vaccination recommendation status of the participants are shown in Table 3. The results showed that there was a statistically significant difference between vaccination recommendation and age (p=0.014), the institution of employment (p=0.002), specialty (p=0.008), the question “Have you had the influenza vaccine during your pregnancy?” (p<0.001), as well as the question “What is your opinion about the Ministry of Health's recommendation for influenza vaccination by placing pregnant women in the risk group?” (p<0.001).

We found a statistically significant difference between the total survey scores and the specialty of practice in the analysis we conducted on the comparison of the total survey scores with some variables. OB-GYN physicians had higher total survey scores than family physicians (t=−2.417, p=0.018). There was a significant difference between the total survey score and the item "Do you recommend influenza vaccination during pregnancy?". The total survey score was higher in those who recommended influenza vaccination during pregnancy compared with that in those who did not (t=−11.596, p<0.001)

The regression equation and the significance levels of the variables are illustrated in Table 4. Multiple logistic regression analysis results showed that not recommending influenza vaccination (dependent variable used in the model) was significantly associated with the following variables: practicing in a secondary healthcare (OR=6.01, p=0.001), finding it unnecessary to recommend influenza vaccination by placing pregnant women in the risk group (OR=76.79, p<0.001) or having no opinion on the issue (OR=30.90, p<0.001), having no knowledge about influenza infection and vaccination during pregnancy (OR=2.60, p=0.034), and the total survey score (OR=0.73, p<0.001).

Table 3. Comparison of Participants' Recommendations for Influenza Vaccination during Pregnancy and Several Variables

	Do you recommend influenza vaccination during pregnancy?			
Variables	**Group**	**No (n=204)**	**Yes (n=215)**	**p**
Age	20–30 years	21 (38,18)	34 (61.82)	**0.014**
	31–40 years	84 (47.19)	94 (52.81)	
	41–50 years	81 (57.04)	61 (23.96)	
	>50 years	29 (65.90)	15 (34.10)	
Institution of Employment	Primary healthcare	175 (56.08)	137 (43.92)	**0.002**
	Secondary healthcare	20 (43.47)	26 (56.53)	
	Tertiary healthcare	20 (32.78)	41 (67.22)	
Specialty	Family Medicine	196 (53.84)	168 (46.15)	**0.008**
	Obstetrics and Gynecology	19 (34.54)	36 (65.46)	
Have you or has your partner had the influenza vaccine during pregnancy?	No	192 (56.63)	147 (43.37)	**<0.001**
	Yes	8 (18.18)	36 (81.82)	
What is your opinion about the Ministry of Health's recommendation for influenza vaccination by placing pregnant women in the risk group?	Beneficial	46 (19.40)	191 (80.60)	**<0.001**
	No opinion	70 (90.90)	7 (9.10)	
	I do not find it necessary	95 (95.00)	5 (5.00)	

(Pearson Chi-Square Test, p<0.05)

Table 4. Multivariate logistic regression results on various variables and not recommending influenza vaccination

	Not recommending influenza vaccination	
Variables	**OR (95% CI)**	**p**
Institution of employment (Tertiary Healthcare)	-	**0.001**
Institution of employment (Secondary Healthcare)	6.01 (2.09–17.09)	**0.001**
Institution of employment (Primary Healthcare)	1.53 (0.36–6.42)	0.557
What is your opinion about the Ministry of Health's recommendation for influenza vaccination by placing pregnant women in the risk group? (Beneficial)	-	**<0.001**
What is your opinion about the Ministry of Health's recommendation for influenza vaccination by placing pregnant women in the risk group? (I do not find it necessary)	76.79 (25.30–233.09)	**<0.001**
What is your opinion about the Ministry of Health's recommendation for influenza vaccination by placing pregnant women in the risk group? (No opinion)	30.90 (11.84–80.62)	**<0.001**
Did you receive information about influenza infection vaccination during pregnancy? (No)	2.60 (1.07–6.31)	**0.034**
Survey Total Score	0.73 (0.61-0.86)	**<0.001**

(R^2 = 0.68, -2 loglikelihood = 278.65)

The results showed that the following variables in the model explained 68% of the factors contributing to the non-recommendation of the influenza vaccination (R2 = 0.68, -2 loglikelihood = 278,65) practicing in a secondary healthcare facility, believing that the Ministry of Health's recommendation to place pregnant women in the risk group for influenza vaccination is unnecessary or having no opinion on the matter, having no

knowledge about influenza infection and vaccination during pregnancy, and low total survey scores. Results of multiple logistic regression analysis showed that the vaccination recommendation dependent variable was significantly associated with the following dependent variables: practicing in a secondary healthcare (OR = 3,91, p = 0,020), practicing in a tertiary healthcare (OR = 6,01, p = 0,001), influenza infection during pregnancy, knowledge about influenza vaccination (OR = 2,60, p = 0,034), and survey total score (OR = 1,36, p < 0,001).

Discussion

Although the pregnant women were defined as a high-risk group for influenza infection, only half of the physicians in our study recommended influenza vaccination for pregnant women. We found that having knowledge regarding influenza infection and vaccination during pregnancy, being a gynecologist and obstetrician, and working in a secondary or tertiary healthcare facility were the primary factors affecting the rate of recommendation of influenza vaccination to pregnant women. Influenza vaccination rates during pregnancy are below the desired level in both developed and developing countries. This rate was 42,3% in the UK, whereas it was reported as 4% in Thailand.[8,13] The highest influenza vaccination rate during pregnancy in Turkey was during the 2009–2010 influenza pandemic (9.1%); however, it was substantially lower than that in the USA (45.7%).[14,15] The rate of influenza vaccination during pregnancy was low in our study.

Vaccination of pregnant women against influenza depends on factors related to both pregnant women and their healthcare providers. In a study conducted in Italy, only 9,7% of women had been vaccinated against the flu, and not receiving a vaccination recommendation was one of the main reasons for not getting vaccinated.[16] In a study conducted in Turkey, the rate of receiving vaccination advice by the healthcare provider during pregnancy was 10,6%, and the rate of influenza vaccination was 1,1%.[17] The same study reported that the most important determining factor in vaccine acceptance during pregnancy was "following the doctor's advice".

In our study, the rate of recommendation for influenza vaccination for pregnant women was low. Most of the physicians in our study believed that the complication and mortality rates due to influenza infection during pregnancy were higher than those in the general population. The fact that physicians were more knowledgeable about influenza infection and vaccination during pregnancy, especially in institutions such as universities and training and research hospitals, where education and research services in the field of health continue, increased the rate of vaccine recommendations, according to our findings. We also determined that being knowledgeable caused a difference in influenza vaccination recommendations during pregnancy. We found in our study that physicians who received knowledge regarding influenza vaccination and infection recommended vaccination at a higher rate. Similar to our results, studies report that the level of knowledge of healthcare professionals influences the vaccination recommendation rate.[18-21]

A study conducted with midwives in Paris reported that having a high level of knowledge about influenza vaccination is an important factor contributing to the recommendation of vaccination to pregnant women.[22] In our study, we found that physicians who had received influenza vaccination during their own pregnancy recommended the vaccine at a higher rate. This result was consistent with the results of previous research. The "personal influenza vaccination status" of healthcare providers is the most important determinant of influenza vaccination recommendation during pregnancy, according to a recent study that examined 32 studies from 15 countries.[23] Different results have been reported in studies examining the effects of physicians' specialties on recommending influenza vaccination to pregnant women.

A Thai study reported that OB-GYN physicians were more likely to recommend vaccination of pregnant women.[24] According to a study conducted in Germany, the vast majority of women received influenza vaccination advice from their OB-GYN physicians.[25] A study conducted in Turkey showed that 50% of the pregnant women who were vaccinated for the flu had it recommended by an FM specialist, whereas 10% had it recommended by an OB-GYN specialist.[17] We also found that OB-GYN physicians recommended vaccination at a higher rate than FP's in our study. Physicians working in secondary and tertiary healthcare were more likely to recommend vaccinations. We believe that this is because insurance companies require a specialized physician's report to reimburse the vaccine. Although the influenza vaccine is administered to pregnant women in Turkey for free, it is not currently a part of the standard immunization schedule. A medical report states that the patient is in the second or third trimester of pregnancy, and a prescription for the vaccine is required for this vaccine to be provided free of charge.[26]

Family physicians do not meet these requirements for a pregnant woman who wants to receive the vaccine for free, especially in the primary healthcare setting that is not within their specialization. Furthermore, the fact that we found no differences in the answers given by family physicians to questions assessing their degree of knowledge in our study supports this opinion.

The first three reasons why physicians did not recommend the influenza vaccine to pregnant women in our study are as follows: the vaccine was not in the standard immunization schedule, the physicians did not have sufficient knowledge about influenza vaccination for pregnant women, and the physicians did not receive training regarding influenza vaccination. These findings are consistent with those of previous research. Fear of the side effects of the vaccine, misunderstandings about vaccine safety and efficacy, and insufficient knowledge about influenza infection all contribute to low rates of influenza vaccination, according to a study conducted with healthcare professionals.[27]

The reasons for not recommending the influenza vaccine include physicians' and pregnant women's lack of awareness of the severity of influenza during pregnancy, their concerns about the vaccine's safety and efficacy,

and the difficulty in acquiring the vaccine, according to several studies.[28,29] In a study conducted in Germany, OB-GYN experts, stated that they did not recommend the vaccine because of concerns about the vaccine's harmful effects on the fetus or baby, as well as concerns of potential side effects during pregnancy, a lack of time to discuss vaccination and a belief that the influenza vaccine was not necessary for pregnant women.[30]

There are few studies on influenza vaccination in pregnant women involving family physicians and OB-GYN specialists. The strength of our study is that it examines the knowledge and attitudes of physicians from both specialties about influenza vaccination during pregnancy. The small size of the study population is one of the limitations of this study. Our study limitations include the small number of participants and the fact that it is based on a survey

The fact that influenza infection is severe in pregnant women and that it increases mortality reveals the importance of vaccination. Physician advice is one of the most influential factors in vaccination. In our study, only half of the physicians recommended influenza vaccination during pregnancy. The factors affecting the rate of recommending influenza vaccination to pregnant women included having sufficient knowledge regarding influenza infection and vaccination during pregnancy, having received influenza vaccination during pregnancy, and being an OB-GYN physician.

The results of our study indicated that in order to increase influenza vaccination rates during pregnancy, the knowledge and awareness of physicians on this issue should be improved. We believe that organizing physician training programs would be advantageous in this regard. Furthermore, increased immunization rates can be accomplished by facilitating free vaccine access for pregnant women and, if possible, integrating the influenza vaccine into the standard maternal immunization schedule.

Ethical Considerations: The approval of the ethics committee was obtained from the Clinical Research Ethics Committee of Health Sciences University of Şişli Hamidiye Etfal Training and Research Hospital (approval no. 1761/dated 14.11.2017). The study was conducted in accordance with the principles of the Declaration of Helsinki. Participation in the study was on a voluntary basis, and informed consent was obtained from each participant. Confidentiality and anonymity of the respondents were also ensured.

Conflict of Interest: The authors declare no conflict of interest. There is no funding for this study.

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