The Prevalence of Seasonal Influenza Vaccination in Pregnant Women Referring to Tertiary Hospitals of Kerman, Iran

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Received 2019 December 30; Revised 2020 January 26; Accepted 2020 February 26.

Abstract

Background: Influenza vaccination is the most effective strategy to prevent comorbidity and mortality of this infection in pregnant women.

Objectives: The current study aimed at evaluating the influenza vaccination rate and its related factors among pregnant women.

Methods: The current cross-sectional study was conducted on 520 pregnant women referring to antenatal clinics of tertiary hospitals affiliated to Kerman University of Medical Sciences from January to April 2019 in Kerman city, Iran. The collected data through a form distributed among the subjects were analyzed using SPSS version 22.

Results: The influenza vaccination coverage rate was 30.0% (95% confidence interval (CI): 26.1 - 34.1) among the pregnant women. Age older than 30 years (AOR = 3.79; 95%CI: 1.55 - 9.24), being employed (AOR = 2.44; 95%CI: 1.01 - 5.88), having an underlying chronic disease (AOR = 4.39; 95%CI: 1.33 - 14.51), receiving recommendation to undergo influenza vaccination (AOR = 65.76; 95%CI: 11.04 - 391.48), and having good knowledge of influenza vaccine (AOR = 9.64; 95%CI: 3.87 - 24.02) increased the likelihood of receiving influenza vaccine.

Conclusions: The current study highlighted that the influenza vaccination coverage rate was suboptimal. Also, findings of the current study suggested that influenza vaccination, as an important component of antenatal care services, should be considered by health policymakers. Furthermore, educating pregnant women and healthcare providers can improve compliance with influenza vaccination.

Keywords: Human Influenza, Pregnant Women, Influenza Vaccine, Iran

1. Background

Influenza is a common infectious disease that affects 5% - 20% of the general population annually worldwide (1). Due to more expensive complications and a higher mortality rate of influenza infection during pregnancy, pregnant women are considered as a high-risk group for the disease (1, 2). Pregnant women with influenza experience a higher rate of hospitalization and admission to intensive care units (ICUs) compared to non-pregnant ones (2). Also, influenza infection during pregnancy, particularly in complicated cases, may affect the fetus and lead to negative pregnancy outcomes such as stillbirth, low weight for gestational age, and preterm birth (3, 4).

Influenza vaccination is the most effective strategy to prevent the infection and its complications during pregnancy (4, 5). Vaccination against influenza decreases the rate of severe infection, hospitalization, ICU admission, and mortality in pregnant women and also reduces negative outcomes of the infection in their fetuses (5, 6). Furthermore, studies demonstrate that influenza vaccination during pregnancy develops effective protection against influenza in infants, at least in the first six months after birth (5, 7). In addition, the safety of the influenza vaccine for mothers and their fetuses in any stage of pregnancy is approved (5, 8).

Despite the recommendation of the World Health Organization to administer the influenza vaccine in pregnant women, influenza vaccination coverage is suboptimal in most areas of the world (8, 9). Several studies in the USA, Ireland, Australia, and Thailand reported seasonal influenza vaccination coverage during pregnancy as 63%, 55.1%, and 25%, respectively (10-12). Also, a systematic review...
reported that influenza vaccination in pregnant women ranged from 1.7% to 88.4% (13). In the Eastern Mediterranean region, it is estimated that a small percentage of high-risk groups, including pregnant women, receive the flu vaccine (14). The rate of influenza vaccination during pregnancy is reported as 6% and 5.5% in two studies in Iran, suggesting the low vaccination coverage among this high-risk group (15, 16).

There are various factors affecting influenza vaccination in pregnant women as barriers or facilitators (13). Concerns about vaccine side effects, poor knowledge of influenza, fear of the needle, negative attitude toward vaccination, and concerns about vaccine safety for the fetus are reported as the main factors influencing vaccination in pregnant women (10, 12, 13, 17, 18). To the authors’ best knowledge, there are a limited number of studies in Iran on the frequency of influenza vaccination and its outcomes amongst pregnant women (15, 16).

2. Objectives

The current study aimed at evaluating the rate of influenza vaccination and outcomes among pregnant women attending antenatal clinics of third-level hospitals affiliated to Kerman University of Medical Sciences.

3. Methods

The current cross-sectional study was conducted on pregnant women attending two antenatal clinics of hospitals affiliated to Kerman University of Medical Sciences from January to April 2019 in Kerman city. Kerman province, with over 2.4 million populations, is located in the Southeast of Iran. The clinics were referral centers providing advanced antenatal care. Pregnant women receiving routine antenatal care services in private or state healthcare system affiliated to Kerman University of Medical Sciences were enrolled in the study. The subjects were recruited regardless of their gestational age by the convenience sampling method.

The data were collected by a form comprised of two parts. The first part included demographic baseline data such as age at current pregnancy, education level, occupation status, and household income status, as well as medical history and antenatal care services such as the number of pregnancies, antenatal care provider, time of the first antenatal care, underlying chronic diseases, and the main setting to get antenatal services. Moreover, data regarding influenza vaccination at the current and previous pregnancies and history of influenza vaccination in family members were collected. The second part of the data collection form was a questionnaire assessing the knowledge of influenza vaccination. The questionnaire had six yes/no/I don’t know questions. Content validity and face validity of the questionnaire were approved by the panel of experts. To evaluate the reliability of the questionnaire, Cronbach’s alpha coefficient was calculated and the results represented its good reliability ($\alpha = 0.86$). For scoring, correct answers were given a score of 1, and the wrong and I do not know answers were scored 0. Knowledge level was categorized as poor (total score $< 4$) and good (total score $\geq 4$).

Data were collected through interviews. The interviewer explained the objectives of the study to the interviewees and assured them about the confidentiality of their information; the questionnaires were then completed after obtaining the written consents. Furthermore, the current study protocol was approved by the Ethics Committee of Kerman University of Medical Sciences (ethics code: IR.KMU.AH.REC.1396.2209).

The data were analyzed using Stata version 14 software. Descriptive statistics, including frequency, percentage, mean, standard deviation, and tables, were used to characterize the study sample. The prevalence of influenza vaccination among the participants was assessed using a bi-variable and multivariable logistic regression model, odds ratio (OR), and 95% confidence interval (CI). All independent variables were entered into the bi-variable model. Also, variables with a P value of $< 0.2$ were entered into the multivariable model. P values less than 0.05 were considered statistically significant.

4. Results

Of the 520 participants, 53.7% were $\leq 30$ years old with the mean $\pm SD$ age of 29.35 $\pm$ 4.6 years. Over 85% of the pregnant women were the residents of urban areas and, approximately, 55% were housewives. Only 9.2% of them had sufficient household income, and education level of 33.1% of them was below high school. Over 60% of the participants had at least an underlying chronic disease such as diabetes, cardiovascular conditions, and chronic respiratory diseases. The majority of the participants (86.5%) received routine antenatal care by obstetricians, and more than 75% of them received routine antenatal care in clinics of the state hospitals. Over 60% of the pregnant women were multiparous, and more than half received their first antenatal care visit in the first gestational trimester (Table 1). The mean $\pm SD$ score of knowledge of influenza and the vaccine was 4.02 $\pm$ 1.55, and 38.3% of the participants had poor knowledge.

The majority of the participants knew that influenza is more dangerous for pregnant women than non-pregnant
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| Variable, Category | No. (%) | Influenza Vaccination Rate, % (95%CI) | P Value |
|--------------------|---------|---------------------------------------|---------|
| Total              | 520 (100) | 30.0 (26.1 - 34.1) | < 0.001 |
| Age, y             |         |                                       |         |
| < 30               | 279 (51.6) | 19.7 (15.2 - 24.8) |         |
| ≥ 30               | 241 (46.4) | 41.9 (35.6 - 48.4) |         |
| Occupational status|         |                                       | 0.002   |
| Housewife          | 288 (55.4) | 24.3 (19.4 - 29.7) |         |
| Employed           | 232 (44.6) | 37.1 (30.8 - 43.6) |         |
| Education level    |         |                                       | 0.003   |
| High school diploma and higher | 348 (66.9) | 34.2 (29.2 - 39.4) |         |
| Below the high school | 172 (33.1) | 21.5 (15.6 - 28.4) |         |
| Number of pregnancy|         |                                       | 0.276   |
| 1                  | 212 (40.7) | 28.3 (22.3 - 34.8) |         |
| 2                  | 209 (42.1) | 28.8 (22.8 - 35.2) |         |
| 3 and higher       | 89 (17.2)  | 37.1 (27.3 - 47.9)  |         |
| Antenatal care provider |         |                                       | 0.002   |
| Midwife and others | 70 (13.5)  | 14.3 (7.1 - 24.7)   |         |
| Gynecologist       | 450 (86.5) | 32.4 (28.1 - 38.9)  |         |
| Household income status |         |                                       | 0.074   |
| Relatively sufficient and insufficient | 472 (90.8) | 31.1 (26.9 - 35.5) |         |
| Sufficient         | 48 (9.2)   | 18.7 (8.9 - 32.6)   |         |
| Gestational age at first antenatal care visit |         |                                       | 0.266   |
| > 3 mn             | 246 (47.3) | 27.6 (22.3 - 31.6)  |         |
| 3 mn and less      | 274 (52.7) | 32.1 (26.6 - 38.0)  |         |
| Underlying chronic disease |         |                                       | < 0.001 |
| No                 | 205 (39.4) | 3.4 (1.4 - 6.9)     |         |
| Yes                | 315 (60.6) | 47.3 (41.6 - 52.9)  |         |
| Influenza vaccine uptake during previous pregnancies |         |                                       | < 0.001 |
| No                 | 292 (91.2) | 26.7 (21.7 - 32.2)  |         |
| Yes                | 28 (8.8)   | 67.8 (47.6 - 84.1)  |         |
| Influenza vaccine uptake by family members |         |                                       | < 0.001 |
| No                 | 467 (89.8) | 27.4 (21.4 - 33.6)  |         |
| Yes                | 53 (10.2)  | 52.8 (38.6 - 66.6)  |         |
| Setting of routine antenatal care |         |                                       | < 0.001 |
| Primary healthcare centers | 92 (17.7)  | 18.5 (11.3 - 27.9)  |         |
| Clinics of state hospitals | 391 (75.2) | 29.9 (25.4 - 34.7)  |         |
| Private clinics     | 37 (7.1)   | 59.4 (42.1 - 75.2)  |         |
| Recommendation for influenza vaccination |         |                                       | < 0.001 |
| No                 | 273 (53.1) | 0.7 (0.1 - 2.6)     |         |
| Yes                | 241 (46.9) | 63.9 (57.4 - 70.0)  |         |
| Knowledge of influenza vaccine |         |                                       | < 0.001 |
| Poor               | 199 (38.3) | 7.8 (3.4 - 10.5)    |         |
| Good               | 321 (61.7) | 44.2 (38.8 - 49.6)  |         |

ones (83.7%), and the influenza vaccine is safe for the pregnant woman (94.4%) and her fetus (89.4%). Also, about 60% of the pregnant women knew that influenza can be a dangerous disease with severe complications and over three-fourths of them knew that the vaccine is effective to protect against influenza; however, only 37.5% were aware of the necessity of influenza vaccination for pregnant women (Table 2).

Totally 30% of the pregnant women (n = 156) reported receiving the influenza vaccine during the current pregnancy. More than 10% reported a history of influenza vaccination among family members and 8.8% received the vaccine in their previous pregnancies.

The influenza vaccination rate was significantly (P <
Table 2. Frequency of Correct Answers to Knowledge Items Among the Study Participants

| Item                                                                 | Correct Answer, No. (%) | Incorrect or I Do Not Know Answer, No. (%) |
|---------------------------------------------------------------------|-------------------------|------------------------------------------|
| 1. Influenza can be a serious disease with severe complications.    | 310 (59.6)              | 210 (40.4)                               |
| 2. Influenza is more dangerous to pregnant women than non-pregnant ones. | 435 (81.7)              | 85 (16.3)                                |
| 3. Vaccine is effective to protect against influenza.               | 393 (75.6)              | 127 (24.4)                               |
| 4. Pregnant women should receive influenza vaccine.                | 195 (37.5)              | 325 (62.5)                               |
| 5. Influenza vaccine is safe for fetus.                            | 465 (89.4)              | 55 (10.6)                                |
| 6. The influenza vaccine is safe for pregnant woman.               | 491 (94.4)              | 27 (5.6)                                 |

0.001) higher among the women older than 30 years (41.9% vs. 19.7%) and the ones with underlying chronic diseases (57.3% vs. 3.4%). The housewives had lower coverage of influenza vaccination compared with the employed ones (37.1% vs. 24.3%, P = 0.002), while the women with higher educational levels had a higher rate of undergoing influenza vaccination (34.2% vs. 21.5%, P = 0.003). The women receiving influenza vaccine during their previous pregnancy had higher vaccination coverage (67.8% vs. 26.7%, P < 0.001), and also women living in families whose members had received an influenza vaccine in the current year reported higher rates of vaccine uptake compared to those who lived in families that no family member was vaccinated (52.8% vs. 27.4%, P < 0.001). The influenza vaccination rate was different in terms of setting of routine antenatal care (P < 0.001). The women receiving their routine antenatal care in private clinics (59.4%) had the highest rate of influenza vaccination, followed by clinics of state hospitals (29.9%) and primary healthcare centers (18.5%). Influenza vaccination coverage was significantly higher (P < 0.001) among the women receiving antenatal care from obstetricians (32.4%) compared with the ones receiving such care from midwives (14.2%). The participants recommended by antenatal care providers (63.9%) to receive the influenza vaccine had a significantly higher rate of influenza vaccination than the ones that were not (0.7%) (P < 0.001). There were no significant differences in influenza vaccination coverage among the participants in terms of the number of pregnancies (P = 0.276), gestational age at the first antenatal care (P = 0.266), and household income (P = 0.076). Moreover, influenza vaccination coverage was significantly higher (P < 0.001) in women with good knowledge compared to the ones with poor knowledge (44.2% vs. 7.8%) (Table 1).

In the bi-variable model, being recommended for influenza vaccination (OR = 239.8; 95%CI: 58.2 - 987.9), having an underlying chronic disease (OR = 25.38; 95%CI: 11.57 - 55.69), having good knowledge of the vaccine (OR = 11.3; 95%CI: 7.3 - 17.5), receiving influenza vaccine during the previous pregnancy (OR = 5.79; 95%CI: 2.51 - 13.34), history of influenza vaccination in family members (OR = 2.96; 95%CI: 1.66 - 5.27), age above 30 years (OR = 2.93; 95%CI: 1.98 - 4.34), receiving routine antenatal care from obstetricians (OR = 2.88; 95%CI: 1.43 - 5.79), having high school diploma or higher education level (OR = 1.89; 95%CI: 1.23 - 2.90), and being employed (OR = 1.85; 95%CI: 1.26 - 2.70) were associated with receiving influenza vaccine in the pregnant women (Table 3).

In the multivariable model, being recommended for influenza vaccination (AOR = 65.76; 95%CI: 11.04 - 391.48) and having good knowledge of influenza vaccine (AOR = 9.64; 95%CI: 3.87 - 24.02) were the strongest predictors for influenza vaccination among the pregnant women. Also, having an underlying chronic disease (AOR = 4.39; 95%CI: 1.33 - 14.51), age above 30 years (AOR = 3.79; 95%CI: 1.55 - 9.24), and being employed (AOR = 2.44; 95%CI: 1.01 - 5.88) were the significant variables in the model (Table 3).

The most common reason to undergo influenza vaccination (91.4%) in the vaccinated women was the vaccination recommendation by healthcare providers, followed by prevention of influenza complications in the fetus (66.4%) and protection of themselves from the disease (64.9%). Also, the most common reason not to receive influenza vaccine in the unvaccinated group was lack of receiving a vaccination recommendation (75.8), followed by being concerned about the vaccine side effects on their fetuses (12.1%), not considering influenza as a severe disease (11.5%), and high cost of the vaccine (9.6%) (Table 4).

5. Discussion

The current study results showed that 30% of the women received influenza vaccine during pregnancy. Several studies reported the influenza vaccination coverage during pregnancy in developed countries such as the USA, Ireland, and Canada as 63%, 55.1%, and 42%, respectively (10, 11, 19). Also, studies in two developing countries of Saudi Arabia and Turkey revealed that 19.8% and 8.9% of pregnant women received the influenza vaccine, respectively (20, 21). A systematic review reported global vaccination coverage...
Table 3. The Prevalence of Influenza Vaccine Uptake Among the Study Participants

| Variable, Category                  | Crude OR (95%CI) | P Value | Adjusted OR (95%CI) | P Value |
|-------------------------------------|------------------|---------|---------------------|---------|
| **Age, y**                          |                  |         |                     |         |
| < 30                                | 1                |         | 1                   |         |
| ≥ 30                                | 2.93 (1.98 - 4.34) | < 0.001 | 3.79 (1.55 - 9.24) | 0.003   |
| **Occupational status**             |                  |         |                     |         |
| Housewife                           | 1                |         | 1                   |         |
| Employed                            | 1.85 (1.26 - 2.70) | 0.003   | 2.44 (1.01 - 5.88) | 0.049   |
| **Education level**                 |                  |         |                     |         |
| Below high school                   | 1                |         | 1                   |         |
| High school diploma and higher     | 1.89 (1.23 - 2.90) | 0.003   | 1.39 (0.46 - 4.22) | 0.557   |
| **Number of pregnancies**           |                  |         |                     |         |
| 1                                   | 1                |         | 1                   |         |
| 2                                   | 1.02 (0.67 - 1.55) | 0.985   |                     |         |
| 3 and higher                        | 1.49 (0.88 - 2.52) | 0.134   |                     |         |
| **Antenatal care provider**         |                  |         |                     |         |
| Midwife and others                  | 1                |         | 1                   |         |
| Gynecologist                        | 2.88 (1.43 - 5.79) | 0.003   | 1.85 (0.15 - 2.50) | 0.632   |
| **Household income status**         |                  |         |                     |         |
| Relatively sufficient and insufficient | 1          |         | 1                   |         |
| Sufficient                          | 0.51 (0.24 - 1.08) | 0.079   | 0.39 (0.08 - 1.73) | 0.218   |
| **Gestational age at first antenatal care visit** |             |         |                     |         |
| >1 mn                               | 1                |         |                     |         |
| 3 mn and less                       | 1.23 (0.84 - 1.80) | 0.267   |                     |         |
| **Underlying chronic disease**      |                  |         |                     |         |
| No                                  | 1                |         | 1                   |         |
| Yes                                 | 25.38 (1.57 - 55.69) | < 0.001 | 4.39 (1.33 - 14.51) | 0.015   |
| **Influenza vaccine uptake during previous pregnancies** |         |         |                     |         |
| No                                  | 1                |         | 1                   |         |
| Yes                                 | 5.79 (2.51 - 13.34) | < 0.001 | 1.72 (0.52 - 5.62) | 0.370   |
| **Influenza vaccine uptake in family members** |             |         |                     |         |
| No                                  | 1                |         | 1                   |         |
| Yes                                 | 2.96 (1.66 - 5.27) | < 0.001 | 0.61 (0.10 - 3.81) | 0.604   |
| **Setting of routine antenatal care** |            |         |                     |         |
| Primary healthcare centers           | 1                |         | 1                   |         |
| Clinics of state hospitals          | 1.88 (1.06 - 3.32) | 0.029   | 2.25 (0.33 - 15.05) | 0.400   |
| Private clinics                     | 6.47 (2.78 - 15.01) | < 0.001 | 1.36 (0.05 - 37.49) | 0.853   |
| **Recommendation for influenza vaccination** |             |         |                     |         |
| No                                  | 1                |         | 1                   |         |
| Yes                                 | 239.8 (58.2 - 987.9) | < 0.001 | 65.76 (11.04 - 391.48) | < 0.001 |
| **Knowledge of influenza vaccine**   |                  |         |                     |         |
| Poor                                | 1                |         | 1                   |         |
| Good                                | 11.3 (7.3 - 17.5) | < 0.001 | 9.64 (3.47 - 24.02) | < 0.001 |

of 1.7% to 88.4% (13). As a result, consistent with studies in neighboring countries such as Saudi Arabia and Turkey, influenza vaccination coverage among pregnant women was suboptimal. Also, 8.7% of the multipara women in the current study reported receiving the influenza vaccine during the previous pregnancy. Moreover, two studies in Iran reported the influenza vaccination rate as 5.5% and 6% (15, 16). One explanation to a higher rate of influenza vaccination in the current study may be the fact that the majority of the studied women had underlying chronic diseases...
Table 4. Reasons for Receiving and Not Receiving the Influenza Vaccine During Pregnancy Among the Study Participants

| Reason for Receiving Influenza Vaccine | Percentage (95%CI) |
|---------------------------------------|-------------------|
| Vaccination recommendation by healthcare providers | 91.4 (85.6 - 94.9) |
| To prevent the fetus from influenza virus infection | 66.2 (58.2 - 74.4) |
| To prevent from influenza virus infection | 64.9 (56.8 - 72.1) |

| Reason for not Receiving Influenza Vaccine | Percentage (95%CI) |
|-------------------------------------------|-------------------|
| Healthcare providers did not recommend to uptake the vaccine | 75.8 (71.1 - 80.0) |
| Worry about the influenza vaccine side effects on the fetus | 12.1 (9.0 - 15.9) |
| Not considering influenza as a severe disease | 11.5 (8.5 - 15.2) |
| Cost of influenza vaccination | 9.6 (6.1 - 13.1) |
| Ineffectiveness of the influenza vaccine | 7.6 (5.2 - 10.8) |
| Fear of injection | 6.5 (4.3 - 9.5) |
| Worry about the influenza vaccine side effects | 1.7 (0.7 - 3.7) |

as an indication to get the influenza vaccine. Additionally, in the current study, 46.8% of pregnant women were recommended to receive the influenza vaccine by their antenatal care providers, while this figure was 0% and 9.9% in the two studies in Iran (15, 16). Therefore, another reason for the vaccine uptake improvement may be that pregnant women in recent years were more likely to be recommended for vaccination by the antenatal care providers.

The current study showed that vaccination recommendation by healthcare providers was the most predicting factor to uptake the influenza vaccine in pregnant women so that over 63% of the women receiving the recommendation were vaccinated. In line with the current study findings, two studies in Australia and the USA reported that receiving advice from an antenatal care provider to uptake the vaccine was the main factor affecting influenza vaccination (10, 12). Similar to the current study findings, a systematic review reported that influenza vaccine uptake was 20 to 100 times more likely in women receiving a recommendation from healthcare providers compared with the ones receiving none (13). Vaccination recommendation by healthcare workers raises the awareness of influenza risks, ensures the vaccine safety and effectiveness, and enhances vaccination acceptance (22).

It was observed that pregnant women with good knowledge of the influenza vaccine were more likely to receive the vaccine. This finding was consistent with those of several other studies (15, 22, 23). There are many negative attitudes and misperceives about the influenza vaccine, such as inoculation of infectious agents or thimerosal into vaccines, harmful ingredients, lack of perceiving influenza risk in pregnancy, mistrust of vaccine efficacy, and vaccine side effects on the mother or her fetus (13, 16, 17, 19, 21, 24-28). Communication between healthcare providers and patients and advising the patients to get treatment or prevention methods, such as vaccines or drugs, lead to improving awareness and enhancing compliance with the interventions (29, 30).

The current study results showed that pregnant women above 30 years had a higher rate of influenza vaccination compared with the younger ones (41.9% vs. 19.7%, OR = 3.79). In accordance with the findings, a study in the USA found that pregnant women older than 30 had higher influenza vaccination coverage (10). Another study reported that pregnant women in the age range of 18 - 24 years were less likely to get influenza vaccine (13). One explanation may be that older pregnant women have more antenatal complications and underlying chronic conditions, and thus, they have more medical visits and receive more prevention recommendations such as influenza vaccination. Studies demonstrated that patients with a higher number of medical visits have better compliance with treatment and preventive interventions. Inconsistent with the current findings, a study in Australia reported that younger women were associated with higher influenza vaccination coverage, and some studies in Iran and other countries revealed no significant association between age and influenza vaccination in pregnant women (4, 12, 15, 18, 31, 32).

The current study demonstrated that pregnant women with underlying chronic diseases, such as cardiovascular diseases and diabetes, were more likely to get an influenza vaccine. In accordance with the current study findings, a study in Australia showed that having a chronic condition increases 2.46 times the likelihood of receiving an influenza vaccine in pregnant women (12). An explanation...
for this finding may be that women with a chronic underlying disease, regardless of pregnancy status, are the target population for the influenza vaccination. As a result, it is more likely to receive vaccination recommendations and consequently get the influenza vaccine. Several studies, inconsistent with the current study, reported no association between having underlying chronic disorders and influenza vaccine uptake in pregnant women (10, 11, 33).

The univariate analysis of the present study showed that the history of influenza vaccination in the previous pregnancy and those of the family members were positively associated with receiving the vaccine during the current pregnancy. A study in the USA reported that receiving the influenza vaccine in the five past years was the main predictor for vaccination during pregnancy (34). A study in Thailand, in accordance with the findings of the present study, reported that the pregnant women receiving the influenza vaccine in a previous pregnancy were more likely to receive the vaccine during the current pregnancy (32). Another study showed that a history of influenza vaccination had a direct association with getting the vaccine during pregnancy (35). Overall, it can be expected that women with a history of influenza vaccine uptake have higher awareness and a more positive attitude toward vaccine efficacy and safety, and thus, are more likely to receive the vaccine.

The current study had two limitations. Firstly, the study was conducted on women attending antenatal clinics of the third-level hospitals, which may lead to the overestimation of the influenza vaccination coverage, and the results cannot be generalized to the population of pregnant women. Second, since the current study had a cross-sectional design, the cause and effect relationships cannot be approved.

5.1. Conclusions

The current study highlighted that influenza vaccination coverage is suboptimal among pregnant women in Iran. Vaccination recommendation by physicians and other antenatal care providers is the key factor influencing influenza vaccination and should be considered as an essential measure of pregnancy care. Also, a good level of knowledge of the influenza vaccine is another important factor in influenza vaccine uptake. In this regard, enhancing awareness of vaccine safety and effectiveness improves vaccination coverage among pregnant women. These findings suggest that influenza vaccination is a component of antenatal care services that should be considered by healthcare providers.

Acknowledgments

The authors would like to thank the participants for the time they spent and the valuable information they shared.

Footnotes

Authors’ Contribution: Study concept and design: Ali Khalooei, Mehran Nakhaeizadeh, and Sulmaz Bahar; analysis and interpretation of data: Ali Khalooei and Mehran Nakhaeizadeh; drafting of the manuscript: Ali Khalooei, Mehran Nakhaeizadeh, and Sulmaz Bahar; critical revision of the manuscript for important intellectual content: Ali Khalooei and Mehran Nakhaeizadeh; statistical analysis: Ali Khalooei and Mehran Nakhaeizadeh.

Conflict of Interests: The authors declared no conflict of interest.

Ethical Approval: The study protocol was approved by the Ethics Committee of Kerman University of Medical Sciences (ethics code: IR.KMU.AH.REC.1396.2209).

Funding/Support: The study was funded by Kerman University of Medical Sciences.

Patient Consent: The objectives of the study and confidentiality of data were explained to the participants and their written consents were obtained.

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