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Original Research Article

Knowledge, attitudes, awareness and factors associated with the uptake of influenza vaccine among pregnant women in urban Pune

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ABSTRACT

Background: This cross-sectional study was aimed to assess the knowledge, attitudes, awareness, facilitators, and barriers associated with the uptake of influenza vaccination during pregnancy in the urban area of Pune.

Materials and Methods: The study was conducted with 500 participants: 62 pregnant women and 438 postpartum women (total 524 were approached) attending Obstetrics and Gynaecology outpatient department (OPD) in a tertiary-care municipal hospital in Pune. The study-questionnaire collected data regarding socio-demographics general knowledge about influenza, attitude towards influenza vaccination, vaccine risk awareness, and its potential risk and benefits during pregnancy. The log-binomial regression models were used to examine the factors associated with influenza vaccination.

Results: A good uptake of the vaccine (223/500, 44.6%) was found during current pregnancy of the participant; however, only 2.7% of study-participants vaccinated with influenza vaccine in their previous pregnancies. Also, there was poor awareness among all the participants regarding the safety of the seasonal influenza vaccine during pregnancy (19%, n=95/500). 11.2% (n=31/277) study-participants were found to be against the maternal influenza vaccination. Women receiving the vaccine against influenza were more likely to be previously informed of the recommendations from health-care providers about maternal influenza vaccination with odds ratio of 0.18 (95% CI, 0.04 to 0.8; p<0.00001), received the influenza vaccine in the past OR 8.27 (95% CI, 0.94 to 72.0), Z 1.09, p=0.05 and of having knowledge on influenza and its complications has more impact on influenza vaccination during pregnancy OR 14.4 (95% CI, 5.68 to 36.53), Z 5.6, p<0.0001 respectively.

Conclusion: This study concludes the vital causative factors for non-vaccination were provision of incomplete information or poor awareness about influenza vaccination (68.6%). There was poor knowledge among the pregnant women regarding the safety of maternal influenza vaccines. The recommendation from healthcare professionals is the major facilitators of decision-making by pregnant women for influenza vaccination during pregnancy.

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1. Introduction

Influenza is a prime cause of mortality and morbidity worldwide, and pregnant women are at a higher risk of severe complications as compared to the non-pregnant women.[1] Influenza in pregnant women is associated with longer hospitalization duration, an increased risk of not only serious or dangerous illnesses, but also of premature delivery, foetal malformations, and a higher mortality rate.[2,3] The vaccination of influenza can reduce the risk of respiratory illnesses in pregnant women and new-born infants up to the age of 6 months.[4] Maternal influenza vaccination can offer secondary protection to infants (for at least for first 6 months) as the antibodies transfer through the placenta.[5]

In 2012, the World Health Organization (WHO) Strategic Advisory Group of Experts (SAGE) recommended that any country with an influenza vaccination program should prioritize pregnant women. Following the WHO recommendations, in 2015, the Maharashtra state government proposed that local health care authorities of endemic regions should vaccinate high-risk populations, such as pregnant women, with seasonal inactivated influenza vaccine free of charge. Since then, selected civic hospitals in Pune have been vaccinating pregnant women with the trivalent Inactivated Influenza Vaccine (IIV3). The overall vaccine coverage in the area has been reported to be low for several reasons. Frequent interruption in the supply of influenza vaccines was an important reason. The findings from a study conducted in Pune indicated that there is lack of awareness of antenatal Influenza vaccine in community although were aware of antenatal TT and routine childhood vaccination and, there was a limited awareness of policy recommendation for antenatal influenza vaccine promotion by the private sector.[6]

Different studies in India have reported of influenza vaccine low uptake among pregnant women.[7,8] To increase the maternal influenza vaccination coverage, it is important to understand the facilitators and barriers to its uptake of influenza vaccination. Along with the availability, access, and cost of vaccines, cultural and religious beliefs of community also play an important role in the uptake of vaccines.[9,10] The vaccine uptake rate is associated with women's belief that women are at a higher risk of complications related with influenza during pregnancy.[11] The major obstacle to vaccine receipt is the lack of awareness of the benefits of the influenza vaccine.[12,13]

In Pune, influenza vaccination drives for priority groups including pregnant women has been initiated in selected Municipal Hospitals. Trivalent Inactivated Influenza Vaccine (TIV) is offered free of charge during the second or third trimester of pregnancy. This study aimed to determine the knowledge, attitudes, and awareness among pregnant and post-partum women regarding the influenza vaccine and the barriers associated with the vaccine uptake during pregnancy.

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2. Materials and Methods

We conducted a cross-sectional descriptive study using a self-administered, closed-ended questionnaire between October 2019 and July 2020. Among potential participants, the pregnant women who visited the antenatal clinics or the post-partum women who visited to childhood immunization clinics in hospital, were included in this study after voluntary, written informed consent. The participants (pregnant and post-partum women) were requested to fill a questionnaire in study-clinic (after voluntary, written informed consent) to assess the knowledge, attitudes, awareness and acceptance of the influenza vaccination. No any exclusion criteria were applied. The primary requirement for participation in the study was willingness to complete the questionnaire. The participants were asked about status of vaccination during pregnancy. Vaccination data were confirmed with the ANC-Card which has Influenza vaccination stamp placed by healthcare workers after vaccination during their ANC clinic visit. Participants who did not carry an ANC card at the time of the survey were asked if they had received influenza vaccine during pregnancy. Simultaneously, their vaccination status was confirmed using the influenza vaccination register maintained at the ANC clinic of the hospital. Ethical approval was obtained from the Ethics Committee of Dr. D. Y. Patil Homeopathic Medical College and Research Centre, Pimpri, before initiating the study.

2.1. Statistical analysis

Descriptive statistics (means, standard deviations, medians, and percentages) were used to describe quantitative and categorical variables. The variables included were age group, educational level, occupation status, pregnancy (primigravida, >1), and income level. Odds ratios (ORs) were estimated to check if there were any associations between knowledge, attitude and demographic factors. To measure the strength of the association, odds ratios were calculated between categorical and outcome variables. The primary outcome variable was the response to maternal influenza vaccination status. It also studied the recommendation from the healthcare provider and vaccination prevalence. In un-vaccinated group, the concerns like safety of vaccine, COVID-19 pandemic and covid vaccine safety, sharing the enough information from healthcare providers were categorized. In analysis, it was assessed about the association of influenza vaccination with factors for vaccination (i.e. age, occupation, education, antenatal care, gestational age at birth, recommendation of influenza vaccination by physician / health care provider,

and knowledge, attitudes and awareness about vaccination). The statistical significance and the precision was estimated by 95% confidence intervals of ORs and The p-value of <0.05. Statistical analysis was performed using the application SPSS software (Version 24).

2.2. Study population and convenience sampling

The influenza vaccination drive is being carried out in Yashwantrao Chavan Memorial Hospital, a Municipal Hospital in Pimpri, Pune, having the higher number of antenatal care (ANC) registrations and deliveries in the area.

The data were collected during duration of Oct-2019 to Jul-2020; 524 (out of 556 enlisted potential participants; 32 approach failure) potential participants were approached, and 500 participants were enrolled in the study after providing voluntary written informed consent (Figure 1).

3. Data collection and recruitment

Convenience method of sampling was used to enrol the participants in the study. Prior voluntary, written informed consent was obtained from each potential-participant interested in enrolment in the study. The questionnaire consists of 29 closed-ended questions which were divided in three sections. Section 1 contained the demographic questions (age, occupation, education, etc.). Section 2 consisted of the questions related to vaccination status of influenza, and pregnancy i.e. gestational age, trimester…etc. Section 3 evaluates the knowledge of the influenza in general, influenza vaccine & its safety, and influenza in pregnant women, also vaccination recommendations during pregnancy. The English questionnaire was translated into the Marathi and Hindi versions and pretested in the field for the content validation, clarity, consistency for knowledge, attitudes, & awareness factors evaluation, and ease of questionnaire administration in participants. The questionnaire consisted of questions on knowledge, attitude, and awareness, with the possibility of yes/no or multiple-choice options and answers. The good knowledge, attitude, and awareness of the influenza vaccine were evaluated by considering the score above the median and vice-versa.

4. Results

4.1. Characteristics of the sample-size in the study

Of the 524 subjects approached, 500 were enrolled in the survey (response rate 95.4%). The demographic characteristics of the sample are shown in Table 1. The median age was 25.8±4.2 years, and most women (48.4%) had received high school education or above. A total of 447 women (89.4%) were housewives, and 49 women (9.8%) were employed in the service sector.

Table 1: Socio-demographic characteristics of the study sample

S. No	Characteristics	N=500	%
1	**Age (in years)**	25.8 ± 4.2	
	≤25	255	51
	26–35	235	47
	≥36	10	2
2	**Parity**		
	Primiparous	279	55.8
	Multiparous	221	44.2
3	**Education**		
	Less than Primary school	13	2.6
	Middle school	57	11.4
	High school	242	48.4
	College or above	188	37.6
4	**Pregnancy status**		
	Ongoing pregnancy	61	12.2
	Post-partum status	439	87.8
5	**Monthly family income (INR)**		
	< 10,000	4	0.8
	10,000– 19,999	40	8
	20,000–49,999	191	38.2
	≥50,000	118	23.6
	Not ready to disclose	147	29.4
6	**Occupation/Job**		
	Housewife	447	89.4
	Service (Public sector)	5	1
	Service (Private sector)	44	8.8
	Others	4	0.8

4.2. The influenza-vaccination status in pregnant women

Of the 500 participants, 223 (44.6%) received the influenza vaccine during the pregnancy. Five of them received the influenza vaccine during the previous pregnancy as well. There was a woman who received the vaccine during the previous pregnancy but not during the present pregnancy.

4.3. The knowledge, attitudes, and awareness of influenza vaccination in pregnancy

Most of the participants (456, 91.2%) thought that vaccines are useful during pregnancy. A total of 458 (91.6%) women were aware of the availability of vaccines during pregnancy, and all 458 reported they knew about tetanus toxoid. However, the availability of the Influenza vaccine was known to only 204 participants. Interestingly 30 women who received the vaccine were also not aware of the Influenza vaccine. There were 11 women were aware of the vaccine but had not received the vaccine. Figure 2 summarizes the knowledge on influenza, its effect on pregnancy and influenza vaccine among study participants.

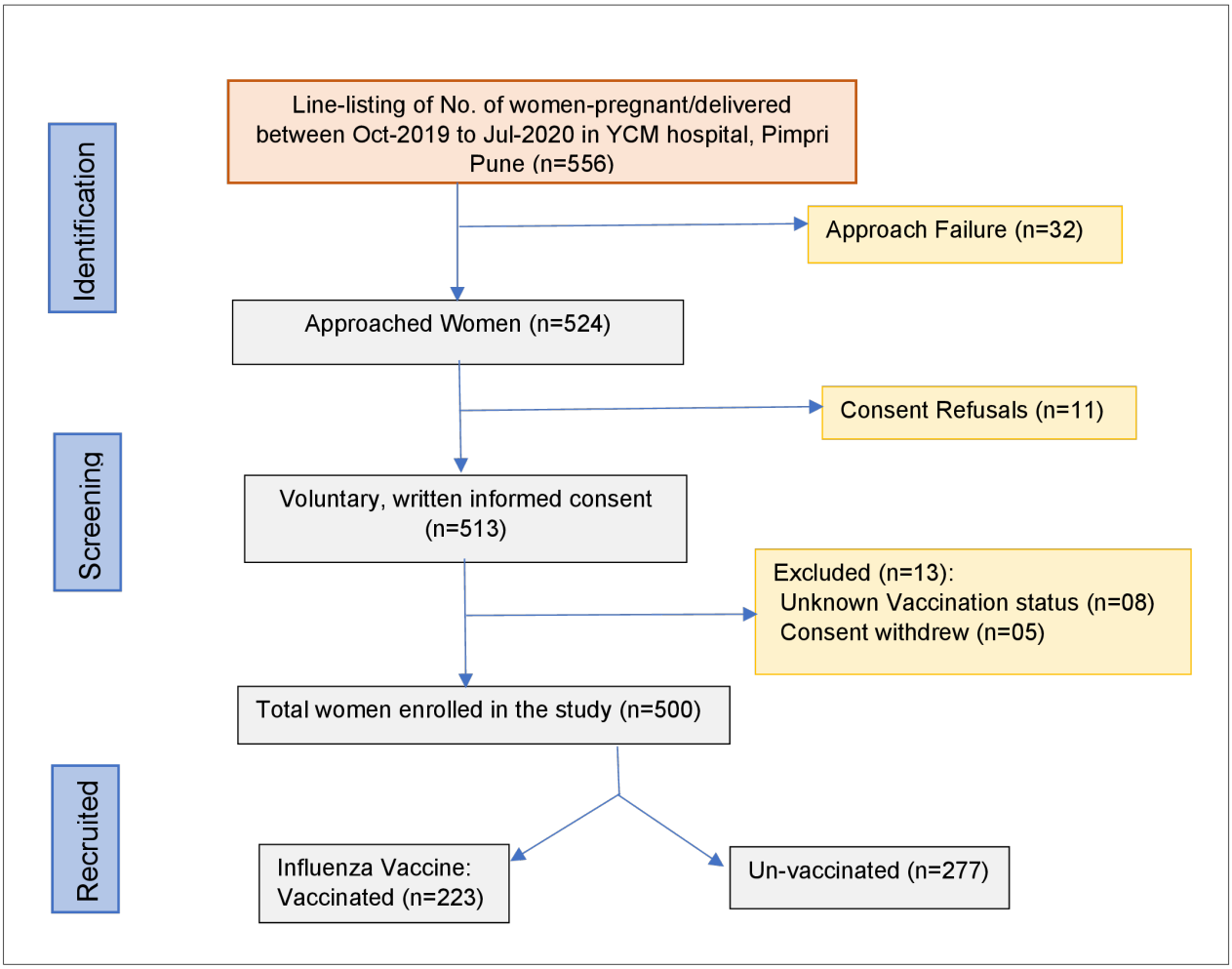

Figure 1: Flowchart of study participants & schedule of events

Table 2: Concerns on influenza immunization in pregnancy in Covid-pandemic

S. No.	Concerns	Vaccination (n=223)	No-vaccination (n=277)	p -value	Odds Ratio 95% CI
1	Concern about ANC- visits in Covid Pandemic	20	35	0.24	0.71 (0.40-1.20)
2	Fear of Flu vaccination in Covid Pandemic	8	19	0.13	0.52 (0.25-1.30)

Table 2 indicates the concerns of study-participants about antenatal visits as the study recruitment was in Covid pandemic (n=55/500, 11%). 4.6% of all the study-participants had mentioned about the fear of flu-vaccination.

Table 3 indicates the source of information about influenza vaccination and personal experience about it. 68.6% (n=190/277) of the study-participants from non-vaccination group indicated about the insufficiently informed about the maternal influenza vaccination while 14.8% (n=41/277) of the participants thought that influenza is not so dangerous to take vaccination against it which indicates the proper counselling and recommendation from health-care personnel. 72.2% (n=200/277) of the study-participants mentioned about decision change if received proper advice or recommendation and offer of influenza vaccine during pregnancy.

Table 4 indicates that the knowledge about vaccine safety and influenza, education and physician's recommendation are associated with vaccination during pregnancy.

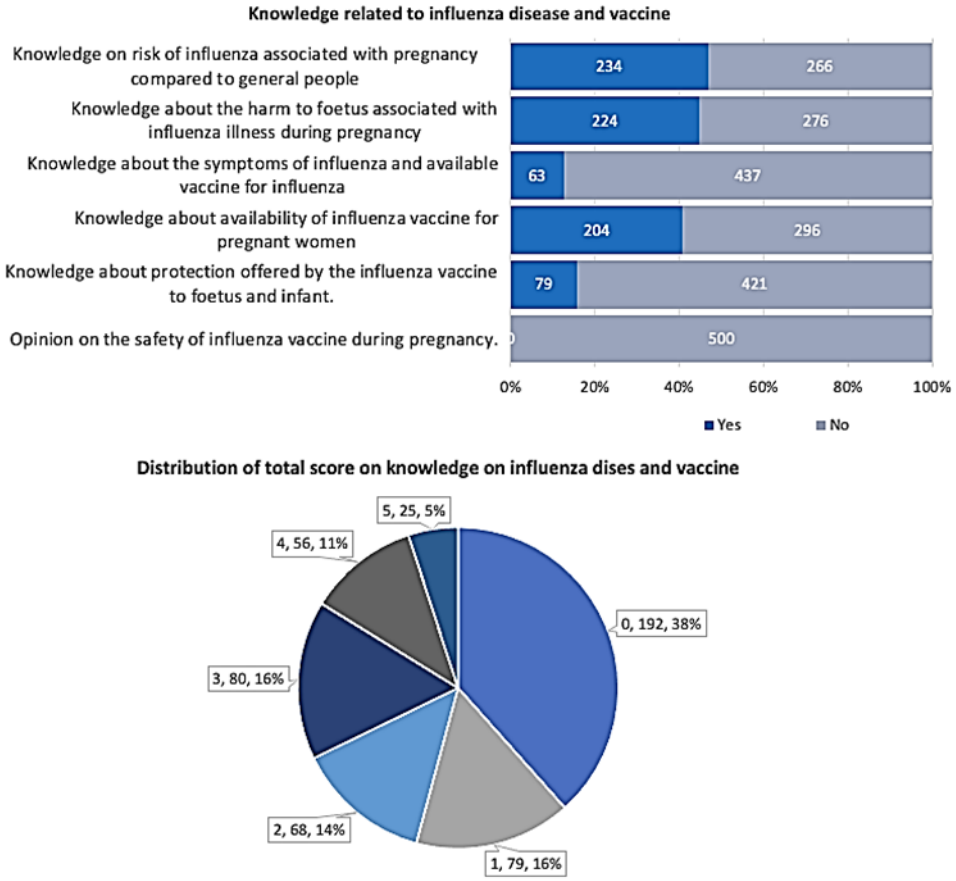

Figure 2: Knowledge related to influenza disease and vaccine among study participants

Table 3: Source of information about influenza vaccination and personal experience

S. No	Items	No-vaccination n = 277 (%)
1	**Reason for Non-vaccination**	
	Not have been sufficiently informed	190 (68.6%)
	Not thinking influenza is so dangerous	41 (14.8%)
	Against vaccine during pregnancy	31 (11.20%)
	Not thinking the influenza vaccine is entirely safe	1 (0.36%)
	Other reason- e.g. religious/ethical objections	14 (5.05%)
2	**Will there is a possibility of changing the decision on vaccination**	
	No	77 (27.8%)
	Yes	200 (72.2%)
	If yes, which can change your opinion	
	Advice from the health care provider	147 (54.4%)
	Advice from the family	100 (36.1%)
	Concern about safety from influenza in pregnancy	16 (5.7%)
	Other specific reason	14 (5.0%)

Table 4: Factors in association with influenza vaccination

S. No.	Factors associated with influenza-vaccination	Odds Ratio	95% Confidence interval	Z	p -value
1	Doctor's Recommendation about influenza-vaccination in Pregnancy matters the uptake				
	No	1			
	Yes	0.18	0.04 to 0.8	2.21	<0.00001
2	Has been received the influenza vaccination in past				
	No	1			
	Yes	8.27	0.94 to 72.0	1.09	0.05
3	Influenza Symptoms & available vaccination Knowledge				
	No	1			
	Yes	14.4	5.68 to 36.53	5.6	<0.0001

p-values were obtained by multiple logistic regression using factors with p <0.10 in analysis.

5. Discussion

In India, a high burden of complications (both maternal & foetal) due to influenza during pregnancy has been reported in several studies.[12–15] Influenza vaccination in pregnant women may protect both pregnant women and infants, as recent studies in Bangladesh and an observational study in American populations reported the benefits of influenza vaccination for both pregnant women and their potential young infants after pregnancy.[4,16] The priority risk group for influenza vaccination are pregnant women as per Health Care Authorities in India;[17] however, the rates of influenza vaccination in pregnancy remain so low as 0.0–12.8%.[6–8,18] This coverage is much lower than that reported in other endemic countries such as Colombia (69%), Bolivia (87%), Brazil (81%), Ecuador (67%), and Cuba (88%).[19] Studies done in Southeast Asian countries have reported a remarkably low influenza vaccine uptake. In this study, we observed that 44.6% of women attending the ANC clinic or Postpartum OPD in Municipal Hospital had received influenza vaccine during pregnancy. This rate appears to be lower than that in other countries but higher than that reported in other studies conducted in India. Importantly, this increased vaccination rate in the YCM Hospital was observed during the COVID pandemic. However, the overall vaccination rate in other government and private hospitals remains a matter of concern.

Awareness among the community and healthcare professionals regarding maternal influenza vaccination is a key factor for improving vaccine uptake. In India, it was found that there is a lack of familiarity among obstetricians about the guidelines on influenza vaccination in pregnancy. This can be upgraded by making awareness through an education campaign targeting obstetricians and other healthcare providers.[20] The women who were personally advised by healthcare providers about the maternal influenza vaccination in pregnancy were seven times more likely to be vaccinated with a prevalence ratio (PR) = 7.11).[21]

This study assessed the knowledge, attitudes, awareness, and the factors associated with maternal influenza vaccination in Pune. In spite of the fact that the awareness of influenza vaccine was high, and most women had a positive attitude towards maternal influenza vaccination, their willingness to get vaccinated was low. We also observed that personal advice from healthcare professionals for maternal influenza vaccination was the most crucial factor associated with increased vaccination uptake; however, only a small proportion of women were advised to be vaccinated. In Hong Kong and Thailand, if recommended by healthcare providers, pregnant women are more likely followed the instructions for maternal influenza vaccination.[22–25] Recommendations from healthcare providers are consistently playing vital role in raising vaccination uptake in countries where uptake is comparably high,[26–28] and healthcare providers with updated knowledge and confidence about the maternal influenza vaccination are more likely to recommend vaccination and gain high vaccine uptake and coverage among expectant mothers.[29–32] The insufficient information on the influenza vaccine among pregnant women and their relatives is another common reason for not being vaccinated. In this study, it was found that solicitous eagerness about influenza and the confidence in influenza vaccination were associated with raised influenza vaccine uptake during pregnancy, which is consistent with previous findings from studies conducted in Australia and South Korea.[33,34] Although 2.7% of the participants had been administered the influenza vaccine in their previous pregnancies, we found that those women were positive for receiving another dose of the vaccine during their next pregnancy. Prior exposure to the influenza vaccine and knowledge regarding vaccines provide confidence in the vaccine among pregnant women. We also observed that fear of the COVID-19 pandemic was not the reason for vaccination or avoidance of vaccination.

6. Limitations

This study involved study-participants only from public hospitals, which are mostly from low socioeconomic groups, and might not have been represented as a sample among all pregnant women in Pune. Furthermore, a significant percentage of pregnant women visits private facilities for antenatal care, and this portion of the population was not included in this study. Hence, further studies considering both public and private hospitals in Rural and Urban Pune should be conducted to avoid sampling-bias. We collected data for 6 weeks study duration. In our data collection, in a few cases, the status of influenza vaccination was self-reported by the study participants and, thus, potentially subject to recall bias. The findings from previous studies indicated that influenza vaccination (self-reported) uptake overrates the coverage, as per computerized registries for vaccination. Due to the COVID-19 lockdown-related restriction in movements, we observed less than the usual number of patients visiting the ANC and Postpartum OPD in the hospital.

7. Conclusion

The maternal influenza vaccination coverage was low in comparison to other endemic countries, although there seems to be an enhancement in vaccine uptake in the Pune urban area. The key to upgrade the influenza vaccine uptake in pregnancy is to encourage healthcare professionals to recommend it. The common and ubiquitous misperceptions regarding influenza and influenza vaccines should be addressed through public communication. The findings of this study contribute the additional discernment for health authorities to propose and implement the plan of action for the promotion of maternal influenza vaccines by health care professionals to improve coverage.

8. Sources of Funding

None.

9. Conflict of Interests

None.

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