

Vaccination rates for pandemic influenza among pregnant women: An early observation from Chennai, South India

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ABSTRACT

Context: World Health organization considers pregnancy as an important risk factor for severe illness due to pandemic influenza and recommends better vaccination coverage for them. **Aims:** This study was initiated to observe the vaccination rates among pregnant women in Chennai during 2 months following the availability of influenza vaccine in the region. **Settings and Design:** An urban community-based setting. Questionnaire-based observational study design. **Materials and Methods:** Pregnant women residing in Chennai selected by simple random sampling formed the study population. The study was conducted from 15th to 30th November 2010. Each pregnant woman was interviewed using a uniform questionnaire. **Statistical Analysis Used:** Characteristics between vaccinated and unvaccinated participants were compared using the Chi-square test or the Fisher exact test for categorical variables and Student's *t*-test or Mann-Whitney *U* test for continuous variables. **Results:** 140 pregnant women were interviewed during the study period. The mean age of study participants was 25 years (range 21-35 years). 55% were less than 26 years of age and 65% were home makers. 32% had no basic school education. Of the 29 women with co-morbidities, 15 had gestational diabetes, 13 hypertension, 7 pre-eclampsia, and 7 had bronchial asthma. Fifty-eight had anemia diagnosed earlier or during current pregnancy. 32 (22.8%) were given advice to get vaccinated for pandemic influenza of which 18 (12.8%) received the vaccine. **Conclusions:** Observations on vaccination rates for pandemic influenza among pregnant women in Chennai, 2 months after the initiation of vaccination program is not encouraging.

KEY WORDS: Knowledge, pandemic influenza, pregnancy, vaccination

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INTRODUCTION

World Health Organization (WHO) considers pregnancy as one among the three physiological risk factors (others being age less than 2 year or more than 65 years) for severe disease due to novel 2009 H1N1 influenza virus and strongly recommends vaccination for them irrespective of the period of gestation.^[1,2] Changes in immune status, cardiac, and respiratory systems are likely reasons for an increased severity of influenza in pregnancy.^[3] A large

surveillance study of pregnant women reported to Centre for Disease Control and Prevention (CDC) in the United States from April to December 2009 identified hospitalization rates among pregnant women suffering from pandemic influenza to be more than four times compared with general population resulting in a maternal mortality rate of 4.3% among symptomatic pregnant women.^[4] Nearly two-thirds (64.5%) of maternal death occurred in the third trimester and nearly one-third (30%) of infected women had pre-term delivery.^[4] Trends appear to be similar in reports from Australia and New-Zealand with pregnant women having greater complications due to 2009 pandemic influenza compared to earlier reports of seasonal influenza.^[5] Clinicians who happened to treat pandemic influenza would agree that the trend was similar in India, but a systematic observation on the illness in pregnancy is not available. Although WHO has declared officially that "world is no longer in phase 6 of the pandemic due to influenza and we have moved to

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the post-pandemic period,” the report also mentions that the virus will circulate among community as a seasonal influenza virus in the years to come and individuals with high-risk for severe infection will continue to be susceptible and need adequate vaccination to prevent severe illness.^[6] The Tamil Nadu state government introduced the vaccination program on September 14th 2010 at King Institute, Guindy, Chennai.^[7] The vaccine was available at private vaccination centers in Chennai about 2 weeks earlier itself. This community-based study was initiated to identify the vaccination rates for pandemic influenza among pregnant women in Chennai during the first 2 months after the launch of influenza vaccine and to analyze factors associated with vaccination or otherwise.

MATERIALS AND METHODS

Pregnant women residing in Chennai on follow-up with either government or private outpatient clinics who were selected by simple random sampling formed the study population. The study was conducted from 15 to 30 November 2010. Residences of pregnant women were located by volunteers of Community Research Network (CRN) with the help of local social health workers, retired health inspectors, and obstetricians followed by house visit by one of the study authors. Regions of Chennai were broadly divided into North, Central, and South Chennai. Each region was further divided into three sub-divisions each separated from other by at least 6 km. Patients residing in each sub-division were questioned on the same day. Order of patient enrolment in the study was based on proximity of patient's residence to the place where the investigators began the process of questioning on a given day. Each pregnant woman was interviewed about details of her age, educational status, permanent residence, current gestational period, number of pregnancies, vaccination status for pandemic influenza, advice received on need for vaccination in pregnancy, reason for not getting vaccinated despite medical advice, whether a patient asked about the need for influenza vaccination to medical professional, details of doctors consulted during pregnancy, total number of medical visits, pre-existing medical co-morbidities, and current pregnancy-related medical complications. After completion of questionnaire if the participant is found unvaccinated, a brief session of counseling was given about the benefits of influenza vaccination, address of government and private agencies delivering the vaccine, details of cost, and guidance on reaching the vaccination sites using public transport. Informed oral consent was obtained from study participants. The CRN ethics committee approved the study.

Statistical analysis

Continuous variables were expressed as mean (range) and categorical variables were expressed as number (%). Differences in baseline characteristics between vaccinated and unvaccinated participants and factors associated with vaccine acceptance among participants who were advised

vaccination were studied using the Chi-square test or Fisher's exact test for categorical variables and Student's *t*-test or Mann-Whitney *U* test for continuous variables. A *P* value <0.05 was considered to be statistically significant. Analysis was carried out with SPSS version 12.

RESULTS

A total of 140 pregnant women were visited and interviewed during the study period. None of the visited participant refused to be interviewed. Participants were residing in Chennai for at least 6 months before the onset of study. Baseline characteristics of study participants are shown in Table 1. The mean age of study participants was 25 years (range 21-35 years). Most of them were less than 26 years of age and were home makers. 80 (57%) were permanent residents of Chennai, while the remaining were primarily based outside Chennai (45 (32%) from urban regions and 15 (11%) from rural regions of south India) and have come to Chennai due to cultural or social reasons. Nearly one-third did not receive any basic school education. Forty-eight were pregnant for the first time, while 92 had at least one living child. Most were in their third trimester. Of the 29 women with co-morbidities, 15 had gestational diabetes, 13 hypertension, 7 pre-eclampsia, and 7 had bronchial asthma. Fifty-eight had anemia

Table 1: Baseline characteristics of study participants

Patient characteristics	All participants (n=140)	Vaccinated participants (n=18)	Unvaccinated participants (n=122)	<i>P</i> value*
Age				
<26 years	77 (55)	9	68 (56)	0.32
26-30 years	57 (41)	8	49 (40)	
31 years and above	6 (4)	1	5 (4)	
Education				
Uneducated	44 (32)	-	44 (36)	0.02
Elementary school	24 (17)	4	20 (16)	
High school	49 (35)	6	43 (35)	
Graduate	23 (16)	8	15 (13)	
Occupation				
Home maker	91 (65)	2	89 (73)	0.01
Employed	49 (35)	16	33 (27)	
No. of living children				
None	48 (34)	9	39 (33)	0.19
One	89 (64)	8	81 (66)	
Two	3 (2)	1	2 (1)	
Trimester				
First	15 (11)	-	15 (12)	0.11
Second	45 (32)	9	36 (30)	
Third	80 (57)	9	71 (58)	
Co-morbidities				
Yes	29 (21)	4	25 (20)	0.61
No	111 (79)	14	97 (80)	
Advised on vaccination				
Yes	32 (23)	18	14 (11)	<0.001
No	108 (77)	-	108 (89)	

*Comparison between vaccinated and unvaccinated participants.

Percentage mentioned in parentheses approximated to nearest whole number

diagnosed earlier or during current pregnancy. Thirty-two (22.8%) were given advice to get vaccinated for pandemic influenza of which 18 (12.8%) received the vaccine (12 at government centers and 6 at private centers). The advice to receive the vaccine was given by obstetrician ($n=19$), physician ($n=8$), general practitioner ($n=4$), and health care worker ($n=6$). Eighteen of 19 women who received advice from obstetrician took the vaccine. None of them reported to have asked their healthcare provider about the need for influenza vaccination in pregnancy. None of them reported to have received an advisory from the communication media (news paper, radio or television). Although all watched television at least 1 h per day, only 10 women reported to have watched or heard government supported channels at least 5 h per week. Each woman was under the care of at least one obstetrician (range 1-3). Twenty-three had visited at least one general practitioner and 31 had visited at least one physician after the vaccine was made available in Chennai. Reason for non-compliance among 14 unvaccinated women who were advised to receive the vaccine were (i) fear of complications due to vaccine ($n=4$), (ii) unawareness of place of vaccine availability ($n=4$), and (iii) unawareness of benefit of vaccine ($n=4$). Spouse suggested a decision on receiving the vaccine to their wife in 14 instances (12 advised and 2 discouraged vaccinations). None of the spouse were available for questioning on the reason for their suggestion on vaccination.

Statistically significant differences between vaccinated and unvaccinated participants were lack of advice on vaccination ($P<0.001$), lack of education ($P=0.02$), and unemployed status ($P=0.01$) among unvaccinated participants, while age, number of children, period of gestation, and presence of co-morbidities showed no statistically significant differences.

Factors associated with vaccination among 32 women who were advised to receive vaccine were advice by obstetrician ($P<0.001$), employed status ($P=0.02$), and positive response from spouse ($P=0.001$). While level of education ($P=0.19$), number of children ($P=0.26$), and presence of co-morbidities ($P=0.13$) had no significant association with vaccine acceptance.

DISCUSSION

The pandemic influenza vaccination rate of 12.8% observed in our study is clearly sub-optimal to prevent serious influenza illness among pregnant women. Vaccination rates against seasonal influenza among pregnant women in the United States were consistently low before the present 2009 pandemic (24% during 2007-2008 season and 11.3% during 2008-2009 season).^[8] However, estimates of vaccination coverage among pregnant women in 10 regions in United States during the current pandemic had been historically high with a rate of 46.6%.^[8] In the present study, only 22.8% of study participants were

advised by a health care provider to receive the vaccine. In comparison, 75.2% pregnant women were advised to receive the flu shot in the United States.^[8] Since in India, routine seasonal influenza vaccination is not administered to pregnant women in the past, advice on receiving the H1N1 vaccine, place of vaccine availability, advantages of vaccine to mother and fetus, safety of vaccine, and cost is highly desirable if provided by health-care providers. Our study observation that most individuals who were advised vaccine by their obstetrician received the vaccine highlights the impact of advice by the primary clinician. Although the present study observed that advice by other specialty doctors and health workers was not as successful as an obstetrician's advice it should not discourage them from giving advice on benefits of flu vaccination. Studies in the United States have shown that advice by health-care provider on vaccination and availability of vaccine at their clinic had resulted in better vaccination rates.^[8] Despite government efforts to spread the message on the need for vaccination through health workers, poster display, and media advertisement, it appears that they are less effective. Although the study could not identify the reason for this, it appeared that television is the most frequent communication media accessed by most pregnant women and private channels are more frequently viewed than government channels probably due to more entertainment content in the former. It may be prudent to suggest that government can encourage private partnership in media coverage of influenza vaccination programs in the near future. The study also suggests the importance of educating the spouse on benefits of vaccination to mother and fetus. The fact that only 4 of 32 women in the present study who were advised vaccination had fear about the safety of vaccine is encouraging since the proportion of patients who refuse vaccination due to reasons related to safety of vaccine is higher in western countries.^[8,9] The study does have important limitations. First, the sample does not represent the entire group of pregnant women in Chennai during the study period. This limitation could not be averted since registries on pregnant women in public and private sector health clinics were not available. Although it can be argued that the representation should be based on birth rates in different regions of the city which could lessen the risk of a poor representative sample, a substantial number of births happening in Chennai were of women who have just migrated to the city for safe confinement and may not reflect the regional representation of pregnant women residing in Chennai. The second limitation is of possible geographical bias and the results of the present study should not be interpolated to sub-urban regions outside the main divisions of Chennai (north, south, and central) and probably other parts of the state.

To conclude, observation on vaccination rates for pandemic influenza among pregnant women in Chennai, 2 months after the initiation of vaccination program is not encouraging. A better involvement from health care providers especially obstetricians with support from other specialists may improve vaccination rates. Educating the

spouse of pregnant women about benefits of vaccine and involvement of private audio-visual media in the spreading the message can yield favorable results.

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