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"Knowledge, attitudes and practices about influenza vaccination among pregnant women and healthcare providers serving pregnant women in Managua, Nicaragua"

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ABSTRACT

Background: Nicaragua implemented an influenza vaccination program for pregnant women with high-risk obstetric conditions in 2007. In 2014, the recommendation of influenza vaccination expanded to include all pregnant women. Given the expansion in the recommendation of vaccination, we evaluated knowledge, attitudes and practices of pregnant women and their healthcare providers towards influenza vaccination and its recommendation.

Methods: We conducted surveys among pregnant women and their healthcare providers from June to August 2016 at two hospitals and 140 health facilities in Managua. The questions were adapted from the U.S. national CDC influenza survey and related to knowledge, attitudes and practices about influenza vaccination and barriers to vaccination. We analyzed reasons for not receiving vaccination among pregnant women as well as receipt of vaccination recommendation and offer by their healthcare providers.

Results: Of 1,303 pregnant women enrolled, 42% (5 4 5) reported receiving influenza vaccination in the 2016 season. Of those who reported not receiving vaccination, 46% indicated barriers to vaccination. Pregnant women who were vaccinated were more likely to be aware of the recommendation for vaccination and the risks of influenza illness during pregnancy and to perceive the vaccine as safe and effective, compared to unvaccinated pregnant women (p-values < 0.001). Of the 619 health workers enrolled, over 89% recalled recommending influenza vaccination to all pregnant women, regardless of obstetric risk. Of the 1,223 women who had a prenatal visit between the start date of the influenza vaccination and the time of interview, 44% recalled receiving a recommendation for influenza vaccination and 43% were offered vaccination. Vaccination rates were higher for those receiving a recommendation and offer of vaccination compared with those who received neither (95% vs 5%, p-value < 0.001).

Conclusion: Pregnant women in Managua had positive perceptions of influenza vaccine and were receptive to receiving influenza vaccination, especially after the offer and recommendation by their healthcare providers.

1. Introduction

Maternal influenza immunization is a priority intervention for Nicaragua [1]. From 2007 to 2012, the Government of Nicaragua offered influenza vaccination to at-risk groups including pregnant women with obstetric risks. In 2013, Nicaragua expanded influenza vaccination to all pregnant women in the municipality of Managua [2], and since 2014, influenza vaccination was included in the annual vaccination campaign for all pregnant women nationwide. Antenatal care in Nicaragua is carried out at primary healthcare facilities; however, pregnant women diagnosed with high-risk obstetric conditions (HROC) may be referred to a tertiary hospital.

A study conducted in 2014 at two hospitals in the Department of Managua found that 55% of 3268 pregnant women were vaccinated against influenza, of which 8% (1 3 7) had been vaccinated in the first trimester of pregnancy, 61% (1093) in the second trimester and 31% (5 5 9) in the third trimester. The study noted that

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vaccinated pregnant women had more chronic diseases compared to unvaccinated ones (60% vs 53%, $p < 0.01$), suggesting that, in spite of the recent recommendation to vaccinate all pregnant women regardless of risk status, health workers continued to prioritize women with HROC [3]. In order to determine if healthcare providers were recommending influenza vaccination to all pregnant women regardless of HROC status, we conducted a follow-up survey of knowledge, attitudes and practices of health personnel and pregnant women in Managua.

2. Methods

2.1. Survey design, hypothesis and sample size

We evaluated knowledge, attitudes and practices of pregnant women and their healthcare providers towards influenza vaccination and its recommendation through a cross-sectional survey. We hypothesized that there were differences in the implementation of the recommendation of influenza vaccination among pregnant women based on HROC status [3]. Hypothesizing that 61% of pregnant women with HROC and 53% without HROC would receive influenza vaccination, and assuming that 57% of pregnant women in our study population would have HROC [3], we calculated a sample size of 1274 women using a formula to detect differences between proportions. Likewise, hypothesizing that 61% of pregnant women with HROC and 53% without HROC would receive influenza vaccination recommendation from a healthcare provider, we calculated a sample size of 600 healthcare providers. We applied a significance level of 0.05 and a statistical power of 0.8 for both calculations.

2.2. Survey for pregnant women

Between June 29 and August 9, 2016--months when influenza typically circulates in Nicaragua [4]--we approached all women who attended prenatal and postpartum visits at the German Nicaraguan Hospital, the Bertha Calderón Roque Hospital and 140 primary healthcare facilities in Managua until sample size was achieved. Women had to have been pregnant during the months of May and June and residents of the Department of Managua in order to participate in the survey.

The questionnaire included demographic information (i.e., age, ethnicity, education level, number of children, marital status, employment status, rural or urban housing area). Adapted from the U.S. national CDC influenza survey [5], the survey instrument included questions about vaccination status in the 2016 season, (from May 23, 2016, the start date of influenza vaccination in the 2016 season, through the time of interview), reasons for not receiving influenza vaccination, barriers to vaccination, knowledge about vaccination recommendation, perceived risk of influenza illness, attitudes about vaccine safety and effectiveness and recall of vaccination recommendation or offer of vaccination at prenatal care visits after May 23, 2016. Additional questions about pregnancy included presence of HROC during pregnancy, diagnosis of HROC, date of last menstrual period, date of first prenatal visit and number of prenatal visits attended.

2.3. Survey for healthcare providers attending to pregnant women

Surveys of health personnel were conducted from August 3 to 26, 2016 at the German Nicaraguan Hospital, the Bertha Calderón Roque Hospital and at 140 primary healthcare facilities serving pregnant women in Managua. As an inclusion criterion, the respondent had to have provided care to pregnant women in their health facility since May 23, 2016. The survey instrument, also adapted from the U.S. national CDC influenza survey [5], included questions about demographics (i.e. age, sex, and education level), knowledge of influenza vaccination policy for pregnant women, perceived risk of influenza disease during pregnancy and attitudes about influenza vaccine safety and effectiveness.

2.4. Data analysis

We present frequencies and proportions of sociodemographic characteristics, HROC status in pregnancy, influenza vaccination in previous pregnancy and receipt of influenza vaccination recommendation and/or offer during prenatal visits. Data analysis for pregnant women was stratified by vaccination status in the 2016 season. The analysis of reasons for not receiving influenza vaccination in the 2016 season was stratified by HROC and by age group (<25, 25 to 34 and ≥35 years old). We also analyzed healthcare providers' influenza vaccination recommendation and offer during prenatal visits after May 23, 2016, stratified by age, HROC and number of prenatal care visits. We calculated the percentages of vaccination by receipt of influenza vaccination recommendation and/or offer of vaccination. We used Pearson X^2 test to assess significance in the difference between proportions. For those who attended a prenatal care visit after May 23, 2016, we also analyzed for associations between participant characteristics (age group, ethnicity, education, employment, civil status, number of children), antenatal care characteristics (number of antenatal care visits, presence of high-risk obstetric conditions, receipt of influenza vaccination in previous pregnancy) and receipt of influenza vaccination recommendation and offer from healthcare provider by bivariate and multivariate analyses. We present unadjusted and adjusted odds ratios (ORs and AORs) with 95% confidence intervals.

Descriptive analyses for healthcare provider survey data are presented in frequencies and proportions.

We used the R software (3.4.0 version) and Microsoft Excel® 2016 for all data analysis.

2.5. Ethics

This program evaluation was approved as public health practice by the Institutional Review Board of the Ministry of Health of Nicaragua. Following Nicaragua law, we obtained informed consent directly from survey participants who were married or who were single and ≥16 years old. For those under 16 years old and unmarried, we obtained their assent and informed consent from their parents or legal guardians.

3. Results

3.1. Survey for pregnant women

A total of 1303 pregnant women participated in the survey. All approached and eligible women agreed to participate in the survey. The majority of pregnant women (59%) surveyed were less than 25 years of age (range: 13–44, median age: 23); 93% self-identified as mestizo (mixed Amerindian and white) ethnicity and 88% had a high school or lower educational level. Most were homemakers (71%), lived with a partner or spouse (87%), and were multiparous (60%). (Table 1) Approximately 97% reported having at least one prenatal visit, and of these, 62% reported that their first prenatal visit occurred in the first trimester. Forty-two percent had a HROC (supplementary Table).

Fewer than half of the women (42%; 545/1303) reported receiving influenza vaccination in the 2016 season (Table 1). Among those who reported being vaccinated, 32% reported receiving influenza vaccination in a previous pregnancy compared with 14%

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