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Maternal pertussis and influenza immunization coverage and attitude of health care workers towards these recommendations in Flanders, Belgium

Kirsten Maertens [a,*], Tessa Braeckman [a], Geert Top [b], Pierre Van Damme [a], Elke Leuridan [a]

[a] Centre for the Evaluation of Vaccination, Vaccine & Infectious Disease Institute, University of Antwerp, Antwerp, Belgium
[b] Agency for Care and Health, Infectious Disease Control and Vaccination, Brussels, Belgium

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ABSTRACT

In Belgium, pertussis vaccination is recommended for all pregnant women in every pregnancy. Adults in close contact with young infants are equally advised to receive a pertussis containing booster dose. Maternal influenza vaccination is likewise recommended in Belgium in the second or third trimester of pregnancy, within the influenza season.

A quantitative multicenter survey study has been performed between October 2014 and May 2015 in both postpartum women (N = 823, response rate = 89.2%) and health care workers (HCWs) (N = 261) to assess the coverage of both vaccines during pregnancy along with the coverage of the pertussis cocoon strategy, and to evaluate the knowledge and recommending attitude of HCWs towards the maternal vaccination strategies and the cocoon strategy among surveyed women and HCWs.

Overall coverage of pertussis vaccination during pregnancy was 64.0%. Most women were vaccinated by their general practitioner (GP) (82.4%), and most often in the third trimester (74.0%) of pregnancy. Overall coverage of influenza vaccination during pregnancy was 45.0%. Again the GP administered most vaccines (67.6%); vaccines were equally administered in the second or third trimester of pregnancy. Educational level had a significant influence on both the pertussis and influenza vaccination coverage during pregnancy while working situation and parity had only an influence on the maternal pertussis vaccination coverage and country of birth only on the maternal influenza vaccination coverage.

Overall, 78.4% of gynecologists and GPs recommends both maternal pertussis and influenza vaccination and 67.0% recommends both maternal vaccination strategies and the cocoon strategy. Within the group of the midwives, only 23.7% recommends both maternal pertussis and influenza vaccination and 10.5% recommends both maternal vaccination strategies and the cocoon strategy.

High coverage is reached among pregnant women for pertussis and influenza vaccination. Several underserved populations of pregnant women regarding maternal immunization, are identified.

1. Introduction

Pregnant women and neonates are at increased risk for vaccine-preventable disease-related morbidity and mortality [1]. Pertussis is a global cause of morbidity and mortality in infants too young to be protected by the currently available vaccines and vaccination schedules. In 2013, whooping cough caused an estimated 63,000 deaths in children below 4 years of age worldwide [2]. In Belgium, the number of confirmed pertussis cases also increased during the last decade with the highest incidence in the youngest infants. Some of these cases ended fatal, with 1–5 cases yearly before 2012. After 2012, no infant fatalities due to pertussis have been notified (Oral communication Scientific Institute of Public Health Belgium). Globally, yearly influenza epidemics are estimated to result in 3–5 million influenza cases and 250,000–500,000 deaths [3]. Pregnant women as well as children under 6 months of age who are too young to be vaccinated with the currently available vaccines, are vulnerable to severe disease resulting in a high rate of influenza related hospitalizations and deaths [4].

Maternal pertussis and influenza vaccination programs have already proven to be effective in preventing illness and hospitalization in both pregnant women and newborn infants [5,6]. According to the recommendations of the World Health Organization (WHO), vaccination of pregnant women with a tetanus, diphtheria, acellular pertussis (Tdap) vaccine in the second or third trimester of

* Corresponding author at: Centre for the Evaluation of Vaccination, Vaccine & Infectious Disease Institute, University of Antwerp, Universiteitsplein 1, 2610 Wilrijk, Belgium.
E-mail address: kirsten.maertens@uantwerp.be (K. Maertens).

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pregnancy (at least one week prior to delivery) should be introduced as a routine complementary strategy in countries with increasing infant morbidity and mortality from pertussis [2]. For influenza, WHO recommends vaccination with inactivated influenza vaccines at any stage of pregnancy. However, the Strategic Advisory Group of Experts (SAGE) of WHO emphasized in April 2015, that maternal influenza vaccination is not a universal recommendation but a recommendation to maximize beneficial effects of influenza vaccines in countries with existing, or initiating new, influenza vaccination programs [7,8].

In Belgium, national recommendations are made by the National Immunization Technical Advisory Group (NITAG). Implementation of the vaccination policy is managed at the subnational level of the 3 regions: the Flemish, Brussels Capital and Walloon region. Pertussis vaccination during pregnancy has been recommended since August 2013 for pregnant women during every pregnancy between 24 and 32 weeks of gestation. If the vaccine is not given during pregnancy, it should be administered in the immediate postpartum within the cocoon strategy. Additionally, all adults in close contact with young infants have been advised to receive a pertussis booster dose once during adult life as part of the cocoon strategy since 2009 [9]. Maternal influenza vaccination has been recommended in Belgium for pregnant women in the second or third trimester of pregnancy coinciding with the influenza season, for more than 10 years [10]. In Flanders, adult pertussis booster has been free of charge since July 2014 and the influenza vaccine is available for pregnant women at a reduced fee.

Health care workers (HCW) are frequently involved in nosocomial outbreaks of pertussis and influenza infection [11,12]. Therefore all HCWs, especially those in contact with risk groups such as pregnant women and newborn infants, should be immunized with an acellular pertussis (aP) containing vaccine and influenza vaccine to minimize potential exposure to patients [9,10].

Achieving vaccine acceptance among both pregnant women and their health care providers is an important healthcare challenge. To identify potential barriers that could be addressed in order to improve the maternal vaccination coverage, a quantitative cross-sectional survey study has been performed. The main aim of the study was to determine the coverage of pertussis and influenza vaccination during pregnancy, along with the assessment of the pertussis cocoon strategy in Flanders. In addition, we aimed to assess the women's awareness and attitude towards the existing maternal immunization recommendations. In a second part of the study, HCWs were interviewed to evaluate their attitude towards the existing maternal vaccination strategies and the cocoon strategy and to determine the pertussis vaccination coverage among this occupational group.

2. Materials and methods

2.1. Study design

A quantitative cross-sectional multicenter study was performed in all five provinces of Flanders, Belgium, between October 2014 and May 2015. Within a group of postpartum women, questions regarding awareness, coverage and attitude towards the existing maternal vaccination recommendations and the cocoon strategy were asked (Annex A). Within a group of HCWs, questions regarding awareness, informing and recommending attitude on maternal vaccination and cocoon vaccination were asked (Annex B). The study was approved by the ethical committee of the University hospital of Antwerp, Belgium (leading ethical committee) and by the regional ethical committees of all collaborating hospitals.

2.2. Study population

2.2.1. Postpartum women

In Flanders, 35 hospitals with more than 800 deliveries per year were identified. From these hospitals, 10 hospitals were selected for participation in the study through random sampling; all selected hospitals agreed to participate. The number of participating hospitals per province was proportional to the number of hospitals per province. Surveys were taken by trained investigators from hospitalized postpartum women. All potential participants were informed on the background, objectives and privacy rules related to the survey. Written informed consent was obtained from all participating women. Exclusion criteria were: aged below 18 years; languages other than Dutch, English, French and Arabic or absence of signed informed consent. The participants did not receive any payment.

2.2.2. Health care workers

Gynecologists and midwives in each participating hospital (in-hospital HCWs) and general practitioners (GPs) in Flanders were invited to complete an encoded questionnaire. In-hospital HCWs received a cover letter together with the questionnaire to explain the purpose of the survey. Several reminder e-mails were sent and the study was also promoted during scheduled staff meetings. GPs were surveyed during symposia or training courses. HCWs did not receive any incentive for participation.

2.3. Data collected

Both questionnaires used a combination of check boxes and free text answers. A pilot survey in both target groups was performed to ensure comprehensiveness.

From postpartum women, data were collected on socio-demographic background and obstetrical conditions including gestational age at delivery and complications during pregnancy. Knowledge, attitudes and behavior towards recommendations for vaccination during pregnancy and the cocoon strategy were addressed as well as their vaccination status.

From in-hospital HCWs and GPs, data were collected on demographical background, knowledge and attitude towards current recommendations for maternal pertussis and influenza vaccination and the cocoon strategy and their current pertussis vaccination status (Questionnaires in annex, can be provided upon request).

2.4. Statistical analysis

Questionnaires from both postpartum women and HCWs were collected and encoded data were entered into two separate Microsoft Access 2013 databases.

Statistical analysis was performed using SPSS version 23.0. Statistical tests included parametric tests: *t*-tests and chi-square tests and their non-parametric alternatives: (paired) Wilcoxon tests and Fisher exact tests whenever the underlying assumptions of the parametric tests were violated i.e. normality and sparseness, respectively [13,14]. Multiple logistic regression models were used to identify determinants that could potentially influence maternal pertussis and influenza vaccination coverage. Only significant influences of variables on the vaccination coverage were reported. A p-value <0.05 was considered as statistically significant.