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SPECIAL COMMUNICATION

Obstetrics

FIGO Statement: Vaccination in pregnancy

Anwar H. Nassar[1] | Gerard H. A. Visser[2] | Wanda Kay Nicholson[3] | Diana Ramasauskaite[4] | Yoon Ha Kim[5] | Eytan R. Barnea[6] | FIGO Safe Motherhood & Newborn Health Committee[7†]

[1]Department of Obstetrics and Gynecology, American University of Beirut Medical Center, Beirut, Lebanon

[2]University Medical Centre, Utrecht, The Netherlands

[3]Department of Obstetrics and Gynecology, University of North Carolina, Chapel Hill, NC, USA

[4]Center of Obstetrics and Gynecology, Vilnius University Medical Faculty, Vilnius, Lithuania

[5]Department of Obstetrics and Gynecology, Chonnam National University Medical School, Gwangju, Korea

[6]S.I.E.P, The Society for the Investigation of Early Pregnancy, New York, NY, USA

[7]International Federation of Gynecology and Obstetrics (FIGO, London, UK

Correspondence
Anwar H. Nassar, Department of Obstetrics and Gynecology, American University of Beirut Medical Center, P.O. Box: 113-6044/B36, Beirut, Lebanon.
Email: an21@aub.edu.lb

Abstract

Pregnant women and their fetuses are among the vulnerable populations that can be severely affected by communicable diseases. As such, some vaccines such as the influenza and the Tdap (tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis) vaccines are strongly recommended in each pregnancy, with generally safe profiles. Other vaccines can be offered based on risk factors, and only when the benefits of receiving them outweigh the risks. Development of vaccines against group B streptococcus infection and respiratory syncytial virus infection are of great importance. In this paper, the recommendations for administration of each vaccine during pregnancy are discussed. The FIGO Committee for Safe Motherhood and Newborn Health Committee endorses the recommendations to vaccinate all pregnant women against influenza during the influenza season at any time during the pregnancy and against Tdap preferably between the 27th and 36th weeks of pregnancy in each pregnancy.

KEYWORDS
Best practice, Maternity care, Safe motherhood, Vaccination

1 | INTRODUCTION

Adult immunization, in general, has not been meeting the global and regional elimination targets, mainly because of misconceptions and wrong beliefs about several aspects of vaccination. In pregnant women, immunization poses an even bigger challenge because of the theoretical belief that some vaccines are transmitted to the fetuses transplacentally and may harm them.[1] Immunization in pregnancy prevents both neonatal and maternal complications through prevention of fulminant disease or by offering passive transfer of protective antibodies across the placenta from the mother to her fetus.[2] Obstetricians and midwives play a vital role in providing information about the vaccines and administering adequate and safe vaccines to pregnant women, as they are their primary care providers. Pregnant women are five to 50 times more likely to accept vaccination if the recommendation is made by their obstetrician.[3] Immunization status should be evaluated and documented by the obstetrician or other healthcare provider during antenatal visits. After recommending a vaccine, there should be documentation that the vaccine was offered, and that the patient accepted or declined it and the reason for declining. Obstetricians and other healthcare providers are encouraged to create a culture of immunization by educating and involving all staff in immunization processes.[4] Storage of all vaccines on site, and having an assistant point out their need with subsequent reinforcement by the obstetrician have been shown to enhance compliance.[4]

Trends to vaccinate in pregnancy have been increasing over time but remain low in several countries. Following the 2009–2010 influenza pandemic, and due to increased influenza vaccine campaigns, the rates of vaccination against influenza increased gradually in the USA reaching 52.2% in the 2013–2014 season[5] with lower uptake among non-Hispanic black women. In Europe, the vaccination coverage in pregnant women ranged from 0% to 58%: the highest were in the Netherlands (58%) followed by Ireland (32%), and the lowest were in Estonia (5%) and Slovenia (1%).[6,7] In Japan, even though it is not offered

[†]FIGO Safe Motherhood & Newborn Health Committee Members are listed at the end of the paper.

routinely, 53.5% of pregnant women seem to have received the influenza vaccine in 2017.[8] In contrast, in Africa and Asia the vaccination rate was less than 1%. Importantly the coverage in South American countries was high, similar to that in high-income countries.[9]

2 | RECOMMENDED VACCINES

Vaccines that are recommended in pregnancy include influenza and Tdap (tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis) vaccines.

2.1 | Influenza vaccine

Influenza is an RNA virus with A and B serotypes that undergoes yearly antigenic shift and drift, causing both endemic and pandemic flu. Globally, it is estimated that during each influenza season, three to five million cases of severe illness, and about 290 000 to 650 000 respiratory deaths secondary to influenza occur.[10] The influenza season is usually between the start of fall and the end of spring. For the past three decades, cases of influenza infection have peaked at some point between the months of October and February but always taper off by April. Pregnant women are among the vulnerable populations, which are at increased risk of morbidity and mortality from influenza.[11] Fetal complications include spontaneous abortion, preterm birth and low birth weight, stillbirth, and neonatal death.[3]

In the 2009 H1N1 pandemic in the USA, 788 pregnant patients were infected with the virus, of which 5% died and 22.6% were admitted to the intensive care unit.[6] Administration of the influenza vaccine can decrease the risk of hospital admission and respiratory illness by 40% and 36% respectively among pregnant women.[7,12] The Center for Disease Control and Prevention (CDC), the Advisory Committee on Immunization Practices (ACIP), and the American College of Obstetricians and Gynecologists (ACOG) recommend that all pregnant women receive the inactivated influenza vaccine once. It can be administered at any time during pregnancy, before and during the influenza season.[2,5] The vaccine has a good safety profile as no study has shown an association with any adverse pregnancy outcome.[5]

2.2 | Tdap vaccine

Tetanus, diphtheria, and pertussis infections can be life-threatening. The childhood vaccination against these three organisms has almost led to eradication of tetanus and diphtheria in many countries worldwide. However, this is not the case for pertussis.[3] Pertussis is an acute respiratory disease caused by *Bordetella pertussis*. It is transmitted by airborne droplets from close contacts. It causes a range of symptoms depending on the host's age, immune status, and history of immunization. Symptoms range from the classical whooping cough, which is characterized by severe bouts of coughing followed by post-tussive vomiting, to apnea, multi-organ failure, and death.[8,13] It is reported that 16–20 million cases of pertussis occur yearly, resulting in the death of approximately 200 000 children.[14] Neonates and infants most probably become exposed through their infected parents, who are often asymptomatic.[3,14] In a study of 616 infants in 2004, the source of the infection was identified to be the mother in 32% of the cases, and another family member in 43% of the cases.[15] Considering this, efforts have been made to protect infants, who do not attain adequate vaccine-induced protection against pertussis until at least 6 months of age. One method is the “cocoon” method, which aims at immunizing adults, to prevent transmission of the infection.[3,8] To date, the only effective method is maternal vaccination, which offers passive immunity to the fetus.[13] The ACIP and the ACOG recommend that pregnant patients receive Tdap vaccine in each pregnancy, regardless of their prior vaccination history. The optimal timing is between 27 and 36 weeks of pregnancy to maximize the maternal antibody response and passive antibody transfer to the fetus.[2,16] If Tdap is not administered during pregnancy, it should be given immediately postpartum.[16] The vaccine needs to be repeated every pregnancy because the levels of maternal antibodies decline with time.[8]

Tdap vaccine is more effective when given during pregnancy than postpartum. Women who received the vaccine during pregnancy and their newborn have higher levels of pertussis antibodies than women receiving the vaccine in the postpartum period.[17] Adverse effects reported with the use of the Tdap vaccine are limited to pain at the site of injection, erythema, and swelling. Most symptoms are mild and resolve within 72 hours.[17] A systematic review showed no association with clinically significant harmful effects on the fetus or the neonate.[18]

It is also recommended that any person who is expected to be in close contact with an infant and has not received Tdap vaccination before gets a single dose of Tdap vaccination at least 2 weeks before they have any contact with the infant.[19]

The World Health Organization (WHO)-recommended vaccination schedule for a pregnant woman varies according to her vaccination history. They consider that those who have received a complete (six-dose) series of a tetanus toxoid-containing vaccine begun during infancy will have sufficient antibody levels to protect themselves and their newborns.[20] However, in high-prevalence and low-income settings, WHO recommends that pregnant women who have not previously been vaccinated against tetanus, or whose immunization status is unknown, receive two doses of a tetanus toxoid-containing vaccine 1 month apart with the second dose given at least 2 weeks before delivery.[20]

3 | OPTIONAL VACCINES

Some women are at increased risk for contracting a certain disease due to existing co-morbidities, occupational habits, or travel plans.

- Hepatitis A vaccine:

This is recommended to pregnant women only if the risk outweighs the benefit and for those at high risk, including travelers to endemic areas, users of injected drugs, and those with clotting factors disorders and chronic liver diseases.[21] The vaccine is delivered in two doses: at 0 and 6 months.[22] The vaccine does not seem to be associated with any adverse outcomes, except for small for gestational age neonates. However, this might be because women who were vaccinated had underlying diseases or conditions which may have led to this adverse outcome.[23]

Hepatitis B vaccine:

In pregnancy, hepatitis B infection is of concern because of the risk of vertical transmission. It is recommended to screen pregnant women prenatally for the presence of hepatitis B surface antigen (HbsAg) and provide the neonate with early intravenous immunoglobulin and vaccination if HbsAg is positive. While this is an effective method for prevention, disease transmission can also occur in utero.[3]

Pregnant women should receive hepatitis B vaccine if they have not been vaccinated before and are at high risk of contracting the infection.[3,24] At high risk are those with more than one sexual partner in the past 6 months, those with a history of a hepatitis B-positive sexual partner, and intravenous drug users.[3] The vaccine is administered intramuscularly in three doses: at 0, 1, and 6 months.[25] The vaccine does not seem to increase the risk of teratogenicity, preterm labor, or spontaneous abortion.[26]

Pneumococcal vaccine:

Two pneumococcal vaccines are available: pneumococcal conjugate vaccine, which covers 13 serotypes (PCV13), and a broader polysaccharide vaccine, which covers 23 serotypes (PPSV23). The PPSV23 should be considered in pregnant women with risk factors such as chronic lung disease including asthma, pre-existing diabetes, cigarette smoking, alcoholism, chronic liver disease, cochlear implants, immunodeficiencies, diseases requiring immunosuppressant therapy, sickle cell disease, and asplenia.[3] However, if it is possible the PPSV23 vaccination should be avoided in the first trimester.

Meningococcal vaccine:

Two effective vaccines are available: a tetravalent conjugate vaccine (MCV4) and a tetravalent polysaccharide vaccine (MPSV4).[3] The vaccine can be given during pregnancy based on risk factors that include women with functional or anatomic asplenia, patients with complement deficiencies, and those living in close contacts such as in dormitories.[3,24]

MPSV4 is given as a single subcutaneous dose whereas the MCV4 is administered as a single intramuscular dose but is usually conjugated with other vaccines.[27]

4 | CONTRAINDICATED VACCINES

Live-attenuated vaccines are contraindicated in pregnancy[2] and include:

- Measles–mumps–rubella
- Varicella

5 | FUTURE DEVELOPMENTS

There are two vaccinations in development for pregnant women, one against group B streptococcus infection and one against respiratory syncytial virus infection; one a bacterial and one a viral infection. Both have a major impact on the newborn, as they account for almost 90 000 and 27 300 neonatal deaths, respectively.[28] Regarding group B streptococcus a similar number of infants may be born with disabilities. The presence of maternal IgG antibody specific to respiratory syncytial virus is associated with reduced prevalence and severity of respiratory syncytial virus disease in the first few weeks of life, whereas maternal serotype-specific anticapsular antibody is associated with protection against both early-onset and late-onset group B streptococcus disease.[29] Both vaccinations are currently under development. Knowledge about the two diseases is generally low amongst pregnant women,[30] but acceptance of a vaccine seems high for both diseases and amongst healthcare professionals.[30,31]

6 | WORLDWIDE IMPLEMENTATION OF MATERNAL VACCINATIONS

During the last 10–20 years effective worldwide vaccination programs have been developed regarding children, now reaching an overall 90% vaccination grade.[32] Similar programs must be developed regarding pregnant women, including creation of awareness amongst women and obstetricians and midwives and development of local distribution. In a large part of the world this may be difficult.

7 | CONCLUSIONS

Worldwide, national immunization programs have led to a significant decrease in vaccine-preventable diseases. However, the numbers seem to be below the target level when it comes to immunization of pregnant women, mostly due to concerns expressed by physicians and patients about vaccine safety. Some vaccines, such as the influenza vaccine and the Tdap vaccine, are recommended for each pregnancy, with a generally safe profile, while other vaccines can be offered to a select group of high-risk pregnant women. Healthcare workers—obstetricians in particular—have a crucial role in promoting maternal vaccination. In the future, more research should be directed at determining the immunogenicity, teratogenicity, and safety of some vaccines in pregnancy. However, in a large proportion of the population in Asia and Africa access to vaccination is largely limited due to social, financial, and cultural barriers and efforts are required to improve vaccination rates in these areas.

MEMBERS OF THE FIGO SAFE MOTHERHOOD AND NEWBORN HEALTH COMMITTEE, 2018–2021

Anwar H. Nassar (chair), Gerard H.A. Visser (past chair), Eytan Barnea, Maria Fernanda Escobar, Yoon Ha Kim, Wanda Kay Nicholson, Rodolfo Pacagnella, Diana Ramasauskaite, Gerhard Theron, Alison Wright.

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CONFLICT OF INTEREST

The authors have no conflicts of interest.

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