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Analiza aktualnej sytuacji zakażeń wertykalnych w Polsce, którym można skutecznie zapobiegać

Rozprawa na stopień doktora nauk medycznych i nauk o zdrowiu

w dyscyplinie nauki medyczne

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Streszczenie w języku angielskim

Title: Analysis of the current situation of vertical infections in Poland that can be effectively prevented

Introduction

According to the data from the Central Statistical Office, the percentage of administered mandatory vaccinations in children and adolescents in Poland decreases every year, including vaccinations against pathogens that may cause vertical infections: rubella virus, hepatitis B virus. According to the Regulation of the Ministry of Health from August 16, 2018 on the standard of perinatal care, every pregnant woman during pregnancy should be tested for infectious diseases that can be transmitted to the fetus, including: human immunodeficiency virus (HIV), hepatitis C virus (HCV), syphilis, *Toxoplasma gondii (T.gondii)*, rubella virus, and hepatitis B virus (HBV). The Polish Immunization Program recommends vaccinations against varicella zoster virus (VZV) while planning pregnancy, in women that had not undergone it before, and it also recommends vaccinations against influenza during pregnancy, and against pertussis between 27th–36th week of gestation. In addition, scientific societies recommend the vaccination against COVID-19 during pregnancy. Despite these recommendations, according to the data from epidemiological reports of the National Institute of Public Health - National Institute of Hygiene, cases of congenital rubella and syphilis, and vertically transmitted HIV, HBV and VZV infections are still reported in Poland. In addition, there are cases of congenital toxoplasmosis noted.

The aims of the doctoral dissertation

1. Analysis of the attitudes of pregnant women on the possibilities of preventing vertical infections **(Publication No. 1)**
2. Analysis of the current principles of diagnosis, treatment and prevention of viral infections in a pregnant women and methods of preventing their vertical transmission **(Publication No. 2)**
3. Analysis of risk factors for *T. gondii* infection in a group of pregnant women **(Publication No. 3)**

4. Analysis of the implementation status of screening testing towards infections during pregnancy (**Publication No. 4)**
5. Analysis of the impact of compliance with the recommended testing during pregnancy on the results of the fetal ultrasound (USG) examination **(Publication No. 4 and No. 5)**

Material and methods

The doctoral dissertation includes a series of 5 full-text publications, consisting of:

1. A cross-sectional survey study on a group of Polish women planning pregnancy, being pregnant or having children on the analysis of their attitudes on the possibility of preventing vertical infections **(Publication No. 1)**
2. A review on the analysis of the current principles of diagnostics, treatment and prevention of viral infections in pregnant women and methods of preventing their vertical transmission **(Publication No. 2)**
3. A case-control study conducted on a group of pregnant women who were referred to the Regional Hospital of Infectious Diseases in Warsaw due to suspected *T. gondii* infection in order to analyze the risk factors for infection with this protozoan in a group of pregnant women **(Publication No. 3)**
4. A letter to the editor, which analyses the impact of compliance with the recommended tests during pregnancy on the result of the fetal ultrasound examination (USG) in a group of pregnant women suspected of *T. gondii* infection referred to the Regional Hospital of Infectious Diseases in Warsaw **(Publication No. 4)**
5. A case-control study conducted on a group of pregnant women, who were referred to the Regional Hospital of Infectious Diseases in Warsaw due to suspected *T. gondii* infection in order to analyze the impact of recommended HIV testing during pregnancy on the fetal ultrasound result **(Publication No. 5)**

Results

In the **Publication No. 1,** we showed that 1712/2402 (71.3%) women had a positive attitude towards vaccination. This attitude was more common in younger women (30.76 years SD ±-5.5 years vs. 31.34 years SD ±5.2 years, p=0.002), nulliparous women (187/243, 77.0% vs. 1525/2159, 70.6%, p=0.0039), and women living in the cities > 100,000 inhabitants (315/690, 51.34% vs. 879/1712, 48.66%, p = 0.013). Moreover, 1712/2402 (71.3%) of women considered vaccination necessary for their children's health, and 1544/2402 (64.3%) believed that vaccines were safe. In addition, 1905/2402 (79.3%) considered vaccines to be effective. According to the survey, 2068/2402 (86.1%) of women had not been vaccinated before pregnancy, and 1931/2402 (80.4%) were not vaccinated during pregnancy. Moreover, only about 3% (67–91 / 2402) of the respondents had been proposed vaccination against influenza or pertussis during their pregnancy. Among the respondents, 284/2402 (11.8%) did not have an opinion on anti-vaccination movements, and 296/2402 (12.3%) on the phenomenon of "chickenpox party".

In the Publication No. 2 we showed that following the recommendations regarding the care of pregnant women might protect against the majority of viral infections that may be transmitted from the mother to her child.

In the **Publication No. 3** we showed that pregnant women with primary *T. gondii* infection compared to the control group were younger (median 28 years, IQR: 24-32 years vs. 32 years, IQR: 29-35 years, p <0.001), more often lived in rural areas (41/74, 55.4% vs. 20/71, 28.2%, p <0.001), more often ate raw meat before pregnancy (43/74, 58.1% vs. 27/71, 38.0%, p=0.016), and more often they were taking care of cats during pregnancy (26/74, 35.1% vs. 12/71, 16.9%, p=0.01). Moreover, the multivariate logistic regression model showed that living in rural area (OR 2.89, 95% CI 1.42–5.9, p=0.004), and eating raw meat (OR 2.07, 95% CI: 1.03–4.18, p=0.04) were independent risk factors for *T. gondii* infection during pregnancy.

The results published in the **Publication No. 4** showed that pregnant women in whom the recommended testing during pregnancy was carried out correctly, were more likely to have a correct fetal ultrasound result (165/172, 95.9% vs. 74/101, 73.3%; OR 29.47; 95% CI: 6.82–127.35; p <0.00001). Only 63% of the women had the recommended testing during pregnancy carried out correctly**.**

The **Publication No. 5** showed that testing for HIV according to recommendations during pregnancy increases the odds of correct fetal ultrasound results (234/243, 96.3% vs. 11/30, 36.7%, OR 44.9; 96% CI 16.6–121.8, $p < 0.00001$).

Conclusions

1. The majority of women planning pregnancy, currently pregnant or being mothers want to be vaccinated (71.3%) and intend to vaccinate their children (71.3%), they consider vaccines to be safe (64.3%) and effective against infectious diseases (79.3%). **(Publication No. 1)**
2. Following the recommendations regarding pregnant woman care can protect against most viral infections transmitted from mother to child **(Publication No. 2)**
3. Independent risk factors for *T. gondii* infection during pregnancy include living in the countryside and eating raw meat. **(Publication No. 3)**
4. Only in 63% of the women, the pregnancy testing was performed correctly according to the recommendations **(Publication No. 4)**
5. Correct implementation of testing during pregnancy increases the risk of correct fetal ultrasound results. **(Publication No. 4 and 5)**