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Trend and challenge in mother-to-child transmission of syphilis

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ABSTRACT

Objective: The aim of the study was to evaluate the epidemiological trends in the incidence rates of mother-to-child transmission of syphilis, syphilis in women of reproductive age and pregnant women in the antenatal care program over the period 1991–2014, in order to find a basis for preventive measures.
Material and method: Case series data of confirmed syphilis was used to evaluate the incidence rates over the period 1991–2014 in Slovakia.
Results: During the monitored period, 101 cases of mother-to-child transmitted syphilis were detected. The rate increased in 1996, corresponding to 33.3 per 100,000 live births and discovered discordance in antenatal care program. The rates of syphilis in women of reproductive age showed increased rate in 2001, corresponding to 10.44 per 100 000 population. Pregnant women reported the highest rate in 2000, corresponding to 3.24 per 1,000 pregnant women population. Syphilis notification rates in all three groups showed increased trend in the first decade following with decreased trend in the second decade. The high decrease in rate notification among pregnant women in 2011 (0.37) decreasing up to 0.11 in 2014 was followed with decreasing of mother-to-child transmission.
Conclusion: Mother-to-child transmission of syphilis poses a public health problem and requires comprehensive surveillance in all countries. These data result in the requirement of effective improvement of antenatal care program in pregnant women. The last years 2011–2014 showed improvement in antenatal care program corresponding with decrease rate of mother-to-child transmission of syphilis.

KEYWORDS

mother-to-child transmission – syphilis in pregnant women – syphilis in women of reproductive age – maternal health

SÚHRN

Švecová D., Luha J.: Trend a výzva v prenose syfilisu z matky na dieťa
Cieľ: Cieľom tejto práce je vyhodnotiť epidemiologický trend v incidencii syfilisu preneseného z matky na dieťa, u žien v reprodukčnom veku a u tehotných žien v súvislosti s programom antenatálnej starostlivosti v období rokov 1991–2014 na Slovensku.
Materiál a metóda: Na vyhodnotenie incidencie v sledovanom období 1991–2014 na Slovensku sa použili prípady potvrdeného syfilisu.
Výsledky: V sledovanom období bolo nahlásených 101 prípadov syfilisu preneseného z matky na dieťa. Incidencia vzrástla v roku 1996, čo predstavovalo 33,3 prípadov/100 000 živonarodených detí a poukázalo na nesúlad v programe antenatálnej starostlivosti. Incidencia syfilisu u žien v reprodukčnom veku ukázala vzrast v roku 2001, čo predstavovalo 10,44 prípadov/100 000 žien v reprodukčnom veku v populácii. Najvyššia incidencia u tehotných žien bola zaznamenaná v roku 2000, čo predstavovalo 3,24 prípadov/1000 tehotných žien v populácii. Všetky tri súbory vykázali vzrastajúci trend v prvej dekáde a klesajúci trend v druhej dekáde. Najvyšší pokles vo výskyte medzi tehotnými ženami bol zaznamenaný nasledovne: výskyt (0,37) v roku 2011 poklesol na 0,11 v roku 2014 a korešpondoval s poklesom výskytu preneseného syfilisu z matky na plod.
Záver: Prenos syfilisu z matky na dieťa predstavuje problém vo verejnom zdraví populácie a vyžaduje si komplexné surveilance vo všetkých krajinách. Zistené údaje vedú k požiadavke účinného zlepšenia programu antenatálnej starostlivosti týkajúcej sa tehotných žien. Posledné roky 2011–2014 poukázali na zlepšenie aplikácie programu antenatálnej starostlivosti, čo korešpondovalo zo znížením počtu syfilisu preneseného z matky na dieťa.

KĽÚČOVÉ SLOVÁ

prenos z matky na dieťa – syfilis u tehotných žien – syfilis u žien v reprodukčnom veku – zdravie matky

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INTRODUCTION

Untreated syphilis in pregnancy can lead to serious complications for a fetus, including stillbirth and neonatal death, premature delivery, low birth weight, or congenital anomalies and active congenital syphilis (CS) in a neonate [7]. The World Health Organization (WHO) estimated that 1.86 million cases of syphilis occur globally each year among pregnant women and a large proportion of cases go untreated or are inadequately treated [19]. Worldwide it is estimated that maternal syphilis is responsible for between 713,600 and 1,575,000 cases of CS [17]. Based on available data, an expert panel

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estimated that 25% of pregnancies with maternal syphilis result in a 2nd trimester miscarriage or stillbirth in the absence of effective treatment, 11% of pregnancies result in neonatal death at term, and 13% result in a preterm or low infant birth weight. An additional 20% of pregnancies result in clinical signs of CS or serologic-positive newborns later develop long-term morbidity from infection if left untreated [13]. Maternal syphilis screening early in pregnancy and prompt treatment of seropositive mothers with intramuscular benzathine penicillin or other effective regimen cures syphilis in both mother and infant, and prevents most complications associated with mother-to-child transmission of syphilis [18]. The incidence of mother-to child transmission of syphilis is related to the prevalence of acquired infectious syphilis within the population; especially to infectious (primary, secondary and early latent) syphilis in females of reproductive age. The rates of syphilis are increasing across European countries, especially in previous post-communist countries that have a large degree of heterosexual transmission and a large rate of females being affected with acquired syphilis at reproductive age [19]. Mother--to-child transmission of syphilis is therefore considered a sentinel public health problem due to its worldwide spread and devastating outcomes, not only in European countries [2, 12, 13].

The aim of this study is to evaluate the epidemiological situation and trends in the mother-to-child transmission of syphilis, acquired syphilis in women of reproductive age and pregnant women in the antenatal care program over two decades reported in Slovakia from 1991 to 2014, in order to find a basis for preventive measures.

MATERIAL AND METHODS

System of surveillance in Slovakia

All physicians and other health providers must notify the Health Information Center in Slovakia about clinically and serologically confirmed cases of syphilis. Other clinicians are encouraged to do the same. Most syphilis cases are managed in departments of dermatovenereology. These facilities provide healthcare to patients with syphilis in line with syphilis mandatory measures. The Report on Sexually Transmitted Infections consists of demographic information, data about mode of transmission and sexual contacts, mother-to-child transmission, serological and/or microscopic confirmation. Cases of mother-to-child transmission syphilis are reported by gynecologists and obstetricians who are the first point of contact with these cases. Antenatal care providers, mostly gynecologists and obstetricians, notify the Health Information Center about pregnant women, their antenatal care, including first and recurring visits, and furthermore, live births, spontaneous abortions and stillbirths.

We used data from the National Health Information Center in Slovakia, which collects and processes surveillance data from all geographical regions of the country [8, 14]. The processing of statistical data was based on the Report on Sexually Transmitted Infections sent by dermatovenereology departments of healthcare providers and other healthcare providers coming into contact with syphilis. Mother-to-child transmission of syphilis cases were managed at pediatric, obstetric and gynecological departments. Laboratory confirmation of syphilis was required. Three data series were evaluated:

1. The number of mother-to-child transmission of syphilis cases reported annually per 100 000 live births;
2. The number of acquired syphilis in women of reproductive age (15–44 aged) reported annually per 100 000 female population of reproductive age and
3. The number of acquired syphilis in pregnant women reported annually per 100 000 female population of reproductive age detected in the antenatal screening program.

Data were evaluated for the years from 1991 to 2014. Cases of acquired syphilis in pregnant women and all women were described by the stage of disease, age and country region.

The data were compiled electronically using the Excel program and analyzed using IBM SPSS Statistics 20 (Chicago, IL, USA). The annual rates of mother-to--child transmission cases of syphilis were calculated per 100,000 live births using denominators from Slovak natality data. The annual rates of acquired syphilis were calculated per 100,000 of the female population in Slovakia. The Eurostat database was used for the calculations.

RESULTS

The first data series evaluated the mother-to-child transmission of syphilis cases in Slovakia. In the period from 1991 to 2014, 101 cases were reported. Figure 1 shows the number of reported cases per 100,000 live births. In the first decade (1991 to 2000), 53 cases reported with increasing number of mother-to-child transmission of syphilis cases from 1 to 20. In the first five years (1991 to 1996), 23 cases reported; the corresponding national rate from 1.3 cases per 100,000 live births in 1992 to 33.3 in 1996. Consecutive period showed fluctuating rates of increase and decrease. In the first decade, the majority (39 cases, 73.6%) of all national mother-to-child transmission syphilis cases reported in the West region of the country. Most cases were detected within the Bratislava region. In the second decade (2001-2010), the majority of all cases, occurred in the East region (60.5%; 23 cases). In the years 2011–2014, 7 cases (70%) were recorded in the East region. Figure 2 shows increased trend in the first decade in notification rates in mother- to-child transmission of syphilis and decreased trend in the second decade.

The second data series evaluated the rate of acquired syphilis in women of reproductive age 15–44 years. In evaluated period (1991-2014), 1981 cases of syphilis recorded among women of reproductive age, 627 cases in the first decade, 929 cases in the second decade and 285 cases in the last four years. Recorded syphilis cases reported national annually with increasing number of syphilis cases from 21 to 161. In the first five years (1991 to 1996), 225 cases reported; the corresponding national rate increased from 1.75 per 100,000 in 1991 to 4.03 in 1996. Consecutive period showed fluctuating rates. The rate of women syphilis cases of reproductive age (per 100 000 of population) shows Figure 3. Figure 2 shows increased trend in the first decade in notification rates in acquired syphilis in women of reproductive age and decreased trend in the second decade.

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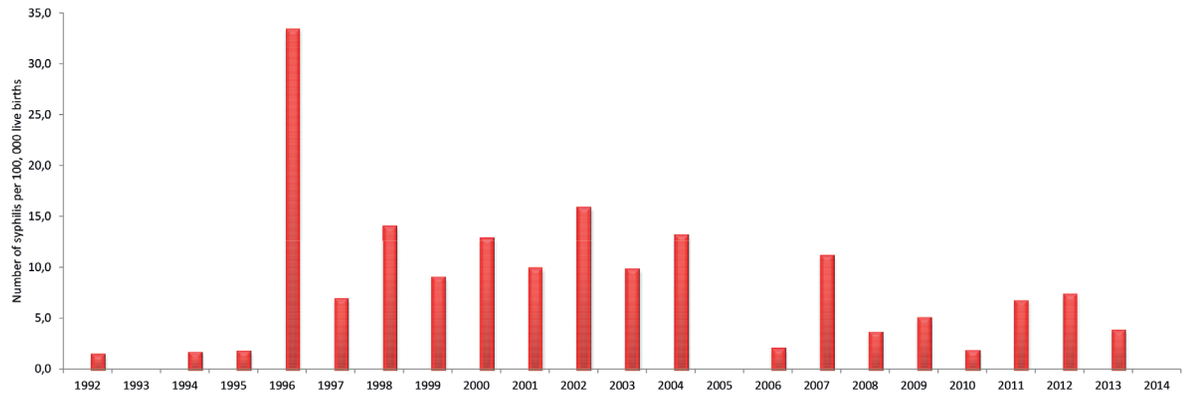


Figure 1. Number of reported mother-to-child transmission of syphilis cases per 100,000 live births (1991–2014)

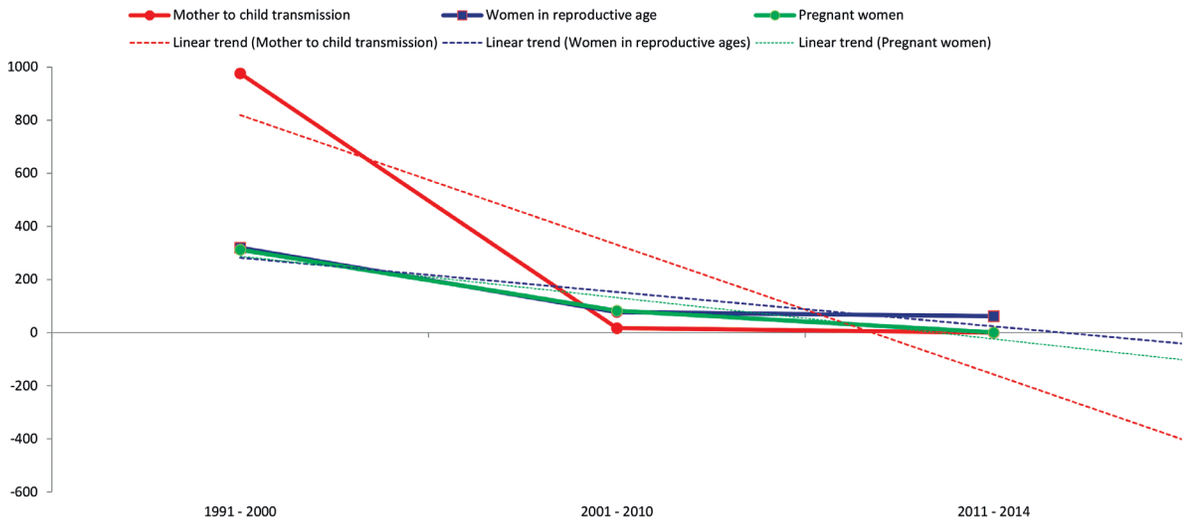


Figure 2. Trend in notification rates of mother-to-child transmission of syphilis, syphilis among women in reproductive age and in pregnant women in period of 1991–2014

The third data series evaluated the rates of syphilis in pregnant women in the antenatal care program. The antenatal program discovered 481 cases of pregnant women with syphilis accounting 25.4% of all women syphilis cases of reproductive age reported in the evaluated period. In the first decade, 88 cases of pregnant women were recorded, in the second decade, 393 cases reported with increasing number of syphilis cases from 1 to 44. In the first five years (1991 to 1996), 26 syphilis cases reported; the corresponding national syphilis rate increased from 0.29 per 1,000 pregnant women in 1991 to 3.24 in 2000. The rate of pregnant women syphilis cases (per 1,000 pregnant women) shows Figure 3. The discrepancy in notification of syphilis in pregnant women and women in reproductive age shows the figure 3 in 2010–2014. Decrease rate in pregnant women correlate with decrease rate in mother-to-child transmission that showed improvement in antenatal care program. Despite these data the notification in reproductive age showed lower decrease associated with rate of syphilis in population. Figure 2 shows increased trend in the first decade in notification rates in acquired syphilis in pregnant women following with decreased trend in second decade. The majority of pregnant women had early syphilis (65%), as well as women of reproductive age (68%) and the late stage of the disease had only 3% and 15%, respectively. The average number of visits in antenatal care units fluctuated from 12.50 in 1991 to 6.80 in 2010. Antenatal mortality shown a decreasing tendency over two decades from 7.50 in 1993 to 3.3 in 2014, but did not document stillborn in mother-to-child transmission of syphilis cases.

DISCUSSION

The antenatal care program possesses widespread screening for mother-to-child transmission of infections,

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Figure 3. Number of reported syphilis cases in women in reproductive age per 100,000 women population in reproductive age and in pregnant women per 1,000 pregnant women in period of 1991–2014

including syphilis, HIV, gonorrhea, and Chlamydia. Although preventive measures are available, such as the use of condoms and effective treatment, syphilis continues to pose a public health problem worldwide [19]. Transmission of syphilis from mother-to-child upon extent of bacteremia in the pregnant women declines gradually during the course of infection. The risk of vertical transmission is 70% for primary and secondary syphilis, 40% for early latent and 10% for late latent syphilis [15]. Active maternal syphilis in developed countries is rare. However, mother-to-child transmission of syphilis is not portable in all European countries resulting in an underestimated incidence of mother-to-child transmission of syphilis. In 2013, 64 cases of mother-to-child transmitted syphilis were reported from 9 European countries and 12 countries reported zero cases [5]. The majority of cases were reported by Bulgaria (27), Poland (19) and Portugal (5), resulting in a high magnitude in Bulgaria (40.6 per 100,000 live births), Portugal (6.0 per 100,000 live births), and Poland (5.1 per 100,000 live births). In the Czech Republic, 31 cases of mother-to--child transmission were reported in period of 1990-2013 resulting in rate from 0.8 to 5.5 per 100 000 live births (latter in 1996) [3, 5]. The occurrence decreased in last year's with evidence of 1 case in the year 2013 (0.9 per 100 000 live birth) [5]. In Slovakia, the rate of mother--to-child transmission of syphilis reached its peak in 1996 (33.3 per 100,000 live births). The extremely high increased rate may be caused by zero cases in the previous period and unprepared health authorities to the eventuality of increased mother-to-child transmission of syphilis, as well as barriers to achieving high coverage of antenatal screening.

In 2013, 22 227 syphilis case were reported in European countries, resulting in overall syphilis rate of 5.5 per 100 000 population. The rate among women was 1.6 per 100 000, ranging between 0.3 (Croatia, Slovenia) and 7.7. (Lithuania) [6]. In Slovakia, syphilis notification rates in mother- to-child transmission of syphilis, women of reproductive age (15–44 years), and pregnant women showed increased trend in the first decade following with decreased trend in the second decade. The discrepancy in notification of syphilis in pregnant women and women in reproductive reported in 2010–2014. Decreased rate in pregnant women correlate with decreased rate in mother-to-child transmission that showed improvement in antenatal care program. Despite these data the notification in reproductive age showed lower decrease associated with rate of syphilis in population. Furthermore, preventive measures against syphilis transmission were less effective in the population, as well as in women of reproductive age in both decades. The initiative to eliminate mother-to-child transmission of syphilis focuses on a harmonized approach to improving health outcomes for mothers and children, which aims to reduce child mortality and improve maternal health. The provider's adherence to guidelines allowed the detection of a high rate of pregnant women with syphilis especially in the first decade. Moreover, a majority of pregnant women attended the antenatal care program and were effectively treated before the end of the first trimester with intramuscular penicillin or other effective regimen to prevent transmission of syphilis to the infant and to treat syphilis in the mother.

To the best of our knowledge, any epidemiological study published increase or decrease rates of mother-to-child transmission of syphilis and syphilis in women in reproductive age and in pregnant women in other European countries. It could be predicted that countries with high rate of mother-to-child transmission of syphilis have also high rate of syphilis in women in reproductive age and pregnant women. The rates of syphilis are increasing across European countries, especially in previous post-communist countries, including Slovakia [9, 16, 19]. However, these countries should be evaluated for

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increase and decrease notification of mother-to-child transmission of syphilis rates because of the threat for syphilis spreading to the neighboring countries. Currently, the internationally standardized processes and criteria to eliminate of mother-to-child-transmission of syphilis are in process of validation. According to WHO, the most important points in the validation of this process are to achieve antenatal care coverage of > 95%; coverage of syphilis testing in pregnant women of > 95%, and treatment of syphilis-seropositive pregnant women of > 95% [18].

The mother-to-child transmission of syphilis rate is the most widely used measure of adverse outcomes of syphilis infection in pregnancy. It is therefore essential to monitor in order to identify failures of programs to eliminate mother-to-child transmission of syphilis. The elimination of mother-to-child transmission of syphilis is considered a public health problem, especially in countries with < 50 cases of congenital syphilis per 100,000 live births [18]. From this point of view all of the European countries belong to regions with a low rate of syphilis infection transmitted from mother-to-child, despite that 1309 cases of mother-to-child transmission were reported in period of 1990–2013 [4, 5]. However, considerable underreporting is suspected. In addition, residual mother-to-child transmission syphilis cases demonstrate the need to develop a more effective antenatal care program, as well as the need for health education of the population. It outlines the introduction of syphilis as an avoidable disease that could be diagnosed early and appropriately treated in infected pregnant women and their partners [1, 11]. However, infants born to treated mother have a 1–2% risk of infection [10].

This epidemiological study possesses some weakness and biases, e.g. the monitoring system did not allow the detection of stillborn and clinical presentation data of mother-to-child transmission syphilis. Antenatal care data showed only an average number of visits and did not allow for the recognition of some marginalized persons or groups. However, statistical date did not allow characterizing the social segregation or drug dependency of notified cases.

Eradication or elimination of mother-to-child transmission of syphilis in the population requires comprehensive surveillance and monitoring systems that can provide accurate data on intervention coverage and quickly detect changes in disease transmission trends, as well as surveillance of high risk groups in the population.

In summary, we found new evidence of rising rates of mother-to-child transmission of syphilis in the first decade following with decreased trend in the second decade. The majority of pregnant women attended an antenatal care program were treated intramuscularly with penicillin or other effective regimen to prevent transmission of syphilis to their infants. The fluctuating rates of mother-to-child transmission of syphilis, women syphilis in reproductive age and pregnant women could be influenced by sexual behavior of risk group in population and adherence of care program. These data result in the requirement of effective improvement of antenatal care in pregnant women and improvement of barriers to achieve higher coverage of the antenatal care program. Mother-to-child transmission of syphilis poses a public health problem and requires comprehensive surveillance in all countries.

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Ethics: Statistical date was evaluated without any evidence to individual persons according to Helsinki Declaration of 1975 as revised in 1983.

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