

TREND RANOG SIFILISA U BEOGRADU U PERIODU OD 2001. DO 2020. GODINE

Bjekić Milan¹, Biljana Begović-Vuksanović², Sandra Grujičić³¹ Gradski zavod za kožne i venerične bolesti, Beograd, Republika Srbija² Gradski zavod za javno zdravlje Beograd, Republika Srbija³ Institut za epidemiologiju, Medicinski fakultet Univerziteta u Beogradu, Beograd, Republika Srbija

* Korespondencija: prim. dr sc. med. Milan Bjekić, Gradski zavod za kožne i venerične bolesti, Džordža Vašingtona 17, 11000 Beograd, Republika Srbija; e-mail: milinkovski@gmail.com

SAŽETAK

Uvod/Cilj: U periodu 2010-2019. godine u zemljama Evropske unije došlo je do porasta obolevanja od sifilisa kod muškaraca za 209,8% i neznatnog porasta kod žena. Naročito je zabeležen porast obolevanja u populaciji muškaraca koji imaju seksualne odnose sa muškarcima (MSM). Cilj ovog rada je bio da utvrdimo trend obolevanja od ranog sifilisa u Beogradu u periodu od 2001. do 2020. godine.

Metode: Za analizu epidemiološke situacije sifilisa na području Beograda, u periodu 2001-2020. godine korišćeni su podaci iz prijava zaraznih bolesti, medicinske dokumentacije, godišnjih izveštaja o radu na sprečavanju, suzbijanju i eliminaciji zaraznih bolesti i rezultati epidemioloških i laboratorijskih ispitivanja. Podaci o broju stanovnika po polu i uzrastu za Beograd su preuzeti iz popisa stanovništva iz 2011. godine, a za godine između popisa korišćene su procene. Na osnovu dobijenih podataka izračunate su sirove, uzrasno specifične i stope incidencije po polu za sifilis. U cilju analize kretanja stopa incidencije za sifilis za period 2001-2020. godine, kao i za period 201-2020. godine, korišćena je *joinpoint* regresiona analiza.

Rezultati: U periodu 2001-2020. godine registrovano je ukupno 938 obolelih od sifilisa, najviša stopa incidencije zabeležena je 2018. godine (8,1/100.000), a najniža 2008. godine (0,5/100.000). U periodu 2001-2008. godine dolazi do opadanja stope incidencije sifilisa za 1,1% godišnje ($p > 0,05$), a u periodu 2009-2020. do značajnog porasta za 24,3% godišnje. U populaciji muškaraca beleži se značajan porast stope incidencije za 20,7% godišnje u periodu 2011-2020. godine, a u populaciji žena za 0,9% godišnje, ali ovaj porast nije bio značajan. Najviše stope incidencije u periodu 2011-2020. godine bile su kod muškaraca uzrasta 30-39 godina, a kod žena za uzrast 20-29 godina. U svim uzrasnim grupama stopa incidencije je bila viša kod muškaraca nego žena, a prosečan odnos obolelih muškaraca i žena je bio 11,9.

Zaključak: Sifilis je i dalje česta polno prenosiva infekcija u Beogradu te su rana dijagnostika i terapija neophodne posebno među pripadnicima vulnerabilnih grupa za polne bolesti da bi se sprečilo širenje ovog oboljenja i nastanak komplikacija. Pošto je čest među ženama u reproduktivnom periodu, antenatalni skrining na ovu infekciju može se preporučiti svim trudnicama, a posebno onim pod povećanim epidemiološkim rizikom.

Key words: sifilis, incidencija, *joinpoint* regresiona analiza

Uvod

Sifilis je sistemsko oboljenje koje izaziva spiroheta *Treponema pallidum*. Prenosi se seksualnim putem, preko krvi i sa inficirane majke na plod. Oboljenje se deli na rani sifilis koji je infektivan i podrazumeva primarni, sekundarni i rani latentni stadijum u trajanju do godinu dana od momenta inficiranja i na kasni sifilis koji nije infektivan, a podrazumeva kasni latentni i tercijarni stadijum. U svetu tokom 2016. godine registrovano je 6,3 miliona novih slučajeva obolelih od sifilisa kod žena i muškaraca starosne dobi od 15 do 49 godina (1).

Prvi zvanični podaci o sifilisu u Beogradu datiraju iz 1899. godine gde je zahvaćenost populacije bila 0,27%, ali bi ovaj podatak prema tvrdnji Mihailovića (2) trebalo uzeti sa rezervom jer je svakako broj obolelih u to vreme bio veći, ali je bilo malo lekara, malo statističara, a i znanja o ovom oboljenju su bila oskudna. Najveći broj inficiranih nalazio se u sekundarnom stadijumu bolesti (74%) i njihovo lečenje se sprovodilo u bolnicama (3). Obolovanje u tom vremenskom periodu se vezivalo za seksualne odnose sa prostitutkama i one su

TRENDS OF EARLY SYPHILIS IN BELGRADE IN THE PERIOD 2001-2020

Bjekic Milan¹, Biljana Begovic-Vuksanovic², Sandra Grujicic³¹ City Institute for Skin and Venereal Diseases, Belgrade, Republic of Serbia² City Institute for Public Health Belgrade, Republic of Serbia³ Institute of epidemiology, Faculty of Medicine, University of Belgrade, Belgrade, Serbia

* Correspondence: prim. dr sc. med. Milan Bjekic, City Institute for Skin and Venereal Diseases, Dzorđa Vasingtona 17, Belgrade 11000, Republic of Serbia; Beograd, Republika Srbija; e-mail: milinkovski@gmail.com

SUMMARY

Introduction/Aim: In the period 2010-2019, in the countries of the European Union, the incidence of syphilis increased by 209.8% in men and in women there was a slight increase. The increase of incidence was particularly noted in the population of men who have sex with men (MSM). The aim of this study was to determine the trend of early syphilis in Belgrade in the period 2001-2020.

Methods: For the analysis of the epidemiological situation of syphilis in the area of Belgrade in the period 2001-2020, data from reports on infectious diseases, medical documentation, annual reports on the work related to the prevention, suppression and elimination of infectious diseases and the results of epidemiological and laboratory tests were used. Data on the number of inhabitants regarding gender and age for Belgrade were taken from the 2011 census, while estimates were used for the years between censuses. Based on the obtained data, raw, age-specific and incidence rates by gender were calculated for syphilis. In order to analyze the trends in incidence rates of syphilis for the period 2001-2020, as well as for the period 2011-2020, joinpoint regression analysis was used.

Results: In the period 2001-2020, a total of 938 cases of syphilis were registered, while the highest incidence rate was registered in 2018 (8.1/100,000), and the lowest in 2008 (0.5/100,000). In the period 2001-2008, the incidence rate of syphilis decreased by 1.1% per year ($p > 0.05$), while in the period 2009-2020, there was a significant increase of 24.3% per year. In the population of men, a significant increase in the incidence rate by 20.7% per year was registered in the period 2011-2020, while in the population of women, this increase was 0.9% per year, and it was not significant. In the period 2011-2020, the highest incidence rates were in men aged 30-39 years, and in women aged 20-29 years. In all age groups, the incidence rate was higher in men than in women, while the average ratio of affected men and women was 11.9.

Conclusion: Syphilis is still a common sexually transmitted infection in Belgrade, and therefore, early diagnosis and therapy are needed, especially among the members of vulnerable groups for sexually transmitted infections, in order to prevent the spread of this disease and the emergence of complications. Since it is common among women in the reproductive period, antenatal screening for this infection can be recommended to all pregnant women, and especially to those at increased epidemiological risk.

Key words: syphilis, incidence, joinpoint regression analysis

Introduction

Syphilis is a systemic disease caused by the spirochete *Treponema pallidum*. It is transmitted sexually, through blood and from an infected mother to the fetus. The disease is classified into early syphilis, which is infectious and includes primary, secondary and early latent stages lasting up to one year from the moment of infection, and late syphilis, which is not infectious, and includes

late latent and tertiary stages. In 2016, 6.3 million new cases of syphilis were registered in the world in women and men aged 15 to 49 (1).

The first official data on syphilis in Belgrade date back to 1899, when 0.27% of the population was affected, but according to Mihailovic (2), this data should be taken with a pinch of salt, because the number of affected people at that time was

bile pod zdravstvenim nadzorom sanitarne policije (4). Porast veneričnih bolesti, naročito sifilisa, u Beogradu, registruje se dvadesetih godina prošlog veka, te se 1928. godine otvara Opštinska ambulanta za kožne i venerične bolesti koja 1938. godine prerasta u Gradsku polikliniku za kožne i venerične bolesti. Oko 80% obolelih je infekciju dobilo usled kontakta sa prostitutkama, a oboleli su najčešće bili iz „radničkih slojeva“ (5).

Prema podacima Marjanovića i saradnika (6) beleži se porast incidencije sifilisa u Beogradu u periodu od 1967. do 1971. godine, a među osobama koje su imale ponavljana obolevanja od veneričnih bolesti najbrojniji su bili radnici zaposleni u uslužnim delatnostima – profesionalni vozači, konobari i nezaposlena lica (7). Tokom devedesetih godina prošlog veka beleži se porast incidencije sifilisa u Beogradu sa najvišom stopom 4,22 na 100,000 za muškarce u 1998. godini i 1,82 na 100,000 za žene u 1997. godini (8). Porast obolevanja je zabeležen kod heteroseksualnih muškaraca koji su zbog ekonomskih sankcija uvedenih Srbiji i Crnoj Gori odlazili na rad u zemlje bivšeg Sovjetskog Saveza, tamo se inficirali, te bolest importovali u Srbiju i prenosili je i na svoje seksualne partnere (8). Početkom novog milenijuma dolazi do pojave epidemija ranog sifilisa u Beogradu, prvenstveno među populacijom muškaraca koji imaju seksualne odnose sa muškarcima (9).

Cilj ovog rada je bio da utvrdimo trend obolevanja od ranog sifilisa kod novoobolelih u Beogradu u periodu od 2001. do 2020. godine.

Metode

Za analizu epidemiološke situacije sifilisa na području Beograda, u periodu 2001-2020. godine korišćeni su podaci iz prijave zaraznih bolesti, medicinske dokumentacije, godišnjih izveštaja o radu na sprečavanju, suzbijanju i eliminaciji zaraznih bolesti i rezultati epidemioloških i laboratorijskih ispitivanja. Usled odsustva podataka o distribuciji obolelih po polu za period prvih deset godina, ovi podaci su prikazani za period 2011-2020. godine. Podaci o beogradskom stanovništvu preuzeti iz popisa stanovništva iz 2011. godine, a za godine između popisa korišćene su procene.

U cilju sagledavanja epidemiološke situacije sifilisa korišćene su sirove, uzrasno specifične i stope incidencije po polu. Stopa incidencije je računata deljenjem broja novoobolelih od sifilisa

za jednu godinu sa brojem stanovnika sredinom posmatrane godine.

U cilju analize kretanja stopa incidencije za sifilis za period 2001-2020. godine, kao i za period 2011-2020. godine, korišćena je *joinpoint* regresiona analiza (10). Primenom ove metode doći će se do podatka o prosečnom godišnjem trendu kretanja obolevanja od sifilisa u posmatranim periodima.

Rezultati

U periodu 2001-2020. godine registrovano je ukupno 938 obolelih od sifilisa, najviše stopa incidencije zabeležena je 2018. godine (8,1/100.000), a najniža 2008. godine (0,5/100.000) (tabela 1). U periodu 2011-2020. godina u Beogradu je prijavljeno 803 obolelih od sifilisa, među kojima je bilo 755 muškaraca i 48 žena. U muškoj populaciji, u posmatranom desetogodišnjem periodu, najviša stopa incidencije je bila 2018. godine (17,7/100.000), a najniža 2013. godine (2,3/100.000), a u ženskoj najviša 2012. godine (0,8/100.000), a najniža 2013. godine (0,2/100.000).

Posmatrajući trend kretanja obolevanja od sifilisa uočava se da u periodu 2001-2008. godine dolazi do opadanja stope incidencije za 1,1% godišnje ($p > 0,05$), a u periodu 2009-2020. do značajnog porasta za 24,3% godišnje (grafikon 1). U populaciji muškaraca beleži se značajan porast stope incidencije za 20,7% godišnje u periodu 2011-2020. godine (grafikon 2), a u populaciji žena za 0,9% godišnje, ali ovaj porast nije bio značajan (grafikon 3).

Najviše stope incidencije sifilisa u Beogradu u periodu 2011-2020. godine registrovane su u uzrastu 30-39 godina kod muškaraca i 20-29 godina kod žena (tabela 2). Najniže stope incidencije su kod muškaraca mlađih od 19 godina, a kod žena starijih od 60 godina. U svim uzrasnim grupama stopa incidencije je viša kod muškaraca nego kod žena, odnos obolelih muškaraca i žena kreće se od 3,9-31,7, prosečan odnos iznosi 11,9.

Diskusija

U zemljama Evropske unije u toku 2019. godine registrovano je 35.039 slučajeva ranog sifilisa (19,2 slučaja na 100.000 stanovnika) (11). Ako se posmatra poslednja decenija u periodu od 2010. do 2019. godine u zemljama Evropske unije došlo je do porasta obolevanja od sifilisa kod muškaraca za

certainly higher, but there were few doctors, and knowledge about this disease was scarce. The largest number of infected people was in the secondary stage of disease (74%) and their treatment was carried out in hospitals (3). The disease in that time period was associated with sexual relations with prostitutes and they were under the health supervision of sanitary police (4). The increase in venereal diseases, especially syphilis was registered in Belgrade in the 1920s, and therefore, in 1928, the Municipal Infirmary for Skin and Venereal Diseases was opened and transformed into the City Polyclinic for Skin and Venereal Diseases in 1938. About 80% of the patients got the infection due to the contact with prostitutes and the patients mostly belonged to the “working class” (5).

According to Marjanovic and associates (6), there was an increase in syphilis in Belgrade in the period 1967-1971, while among persons who had repeated venereal diseases, the most numerous were workers employed in service industries – professional drivers, waiters and the unemployed (7). During the 1990s, an increase in the incidence was registered in Belgrade with the highest rate of 4.22 per 100,000 for men in 1998 and 1.82 per 100,000 for women in 1997 (8). The increase in morbidity was registered in heterosexual men, who went to work in the countries of the former Soviet Union due to the economic sanctions introduced in Serbia and Montenegro, got infected there and imported the disease to Serbia and transmitted it to their sexual partners (8). At the beginning of the new millennium, epidemics of early syphilis appeared in Belgrade, primarily in the population of men who have sex with men (9).

The aim of this study was to determine the trend in morbidity of early syphilis in newly diagnosed patients in Belgrade from 2001 to 2020.

Methods

For the analysis of the epidemiological situation of syphilis in the Belgrade area, in the period 2001-2020, data from reports of infectious diseases, medical documentation, annual reports on work on the prevention, suppression and elimination of infectious diseases and the results of epidemiological and laboratory tests were used. Due to the fact that there were no data on the distribution of affected persons by sex for

the first ten years, these data were presented for the period 2011-2020. Data on the number of inhabitants for Belgrade were taken from the 2011 census, while estimates were used for the years between censuses.

Based on the obtained data, raw, age-specific and incidence rates by gender were calculated for syphilis. The incidence rate was calculated when the number of new cases of syphilis for one year was divided by the population in the middle of the observed year.

In order to analyze the trends in incidence rates for syphilis for the period 2001-2020. year, as well as for the period 2011-2020. year, joinpoint regression analysis was used (10). By applying this method, data will be obtained on the average annual trend in the incidence of syphilis in the observed periods.

Results

In the period 2001-2020, a total of 938 syphilis cases were registered, while the highest incidence rate was registered in 2018 (8.1/100,000), and the lowest in 2008 (0.5/100,000) (Table 1). In the period 2011-2020, 803 syphilis cases were reported in Belgrade, of whom 755 were men and 48 women. In the male population, in the observed ten-year period, the highest incidence rate was in 2018 (17.7/100,000), and the lowest was in 2013 (2.3/100,000), while in the female population, the highest incidence rate was in 2012 (0.8/100,000), and the lowest in 2013 (0.2/100,000).

Observing the trend in the incidence of syphilis, it can be seen that in the period 2001-2008, the incidence rate decreased by 1.1% per year ($p>0.05$), while in the period 2009-2020, it increased significantly by 24.3% per year (Figure 1). In the male population, a significant increase of 20.7% per year was noted in the period 2011-2020 (Figure 2), and in the female population, 0.9% per year, but this increase was not significant (Figure 3).

The highest incidence rates of syphilis in Belgrade in the period 2011-2020 were registered in the age group 30-39 years in men and 20-29 years in women (Table 2). The lowest incidence rates were in men younger than 19, and in women over the age of 60. In all age groups, the incidence rate was higher in men than in women, the ratio of affected men and women ranged between 3.9-31.7, while the average ratio was 11.9.

Tabela 1. Stope incidencije sifilisa (na 100.000), ukupno i prema polu, Beograd, 2001-2020. godine

Godine	Ukupno	Muškarci	Žene
2001	0,7	/	/
2002	1,0	/	/
2003	0,7	/	/
2004	1,1	/	/
2005	1,0	/	/
2006	0,5	/	/
2007	0,8	/	/
2008	0,5	/	/
2009	0,7	/	/
2010	2,2	/	/
2011	1,5	2,8	0,3
2012	2,8	5,0	0,8
2013	1,2	2,3	0,2
2014	4,0	7,8	0,7
2015	5,5	11,1	0,6
2016	5,1	9,3	0,7
2017	5,8	11,7	0,5
2018	8,1	17,7	0,2
2019	7,9	15,4	1,1
2020	6,6	13,5	0,3

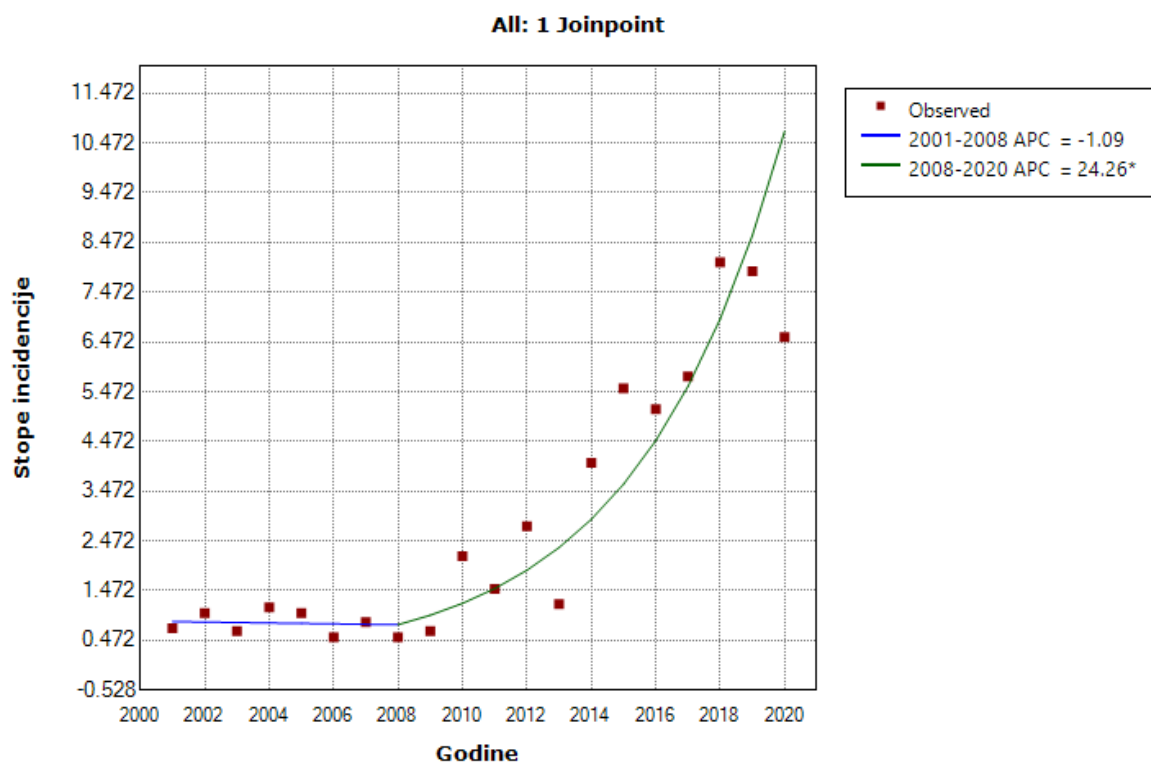
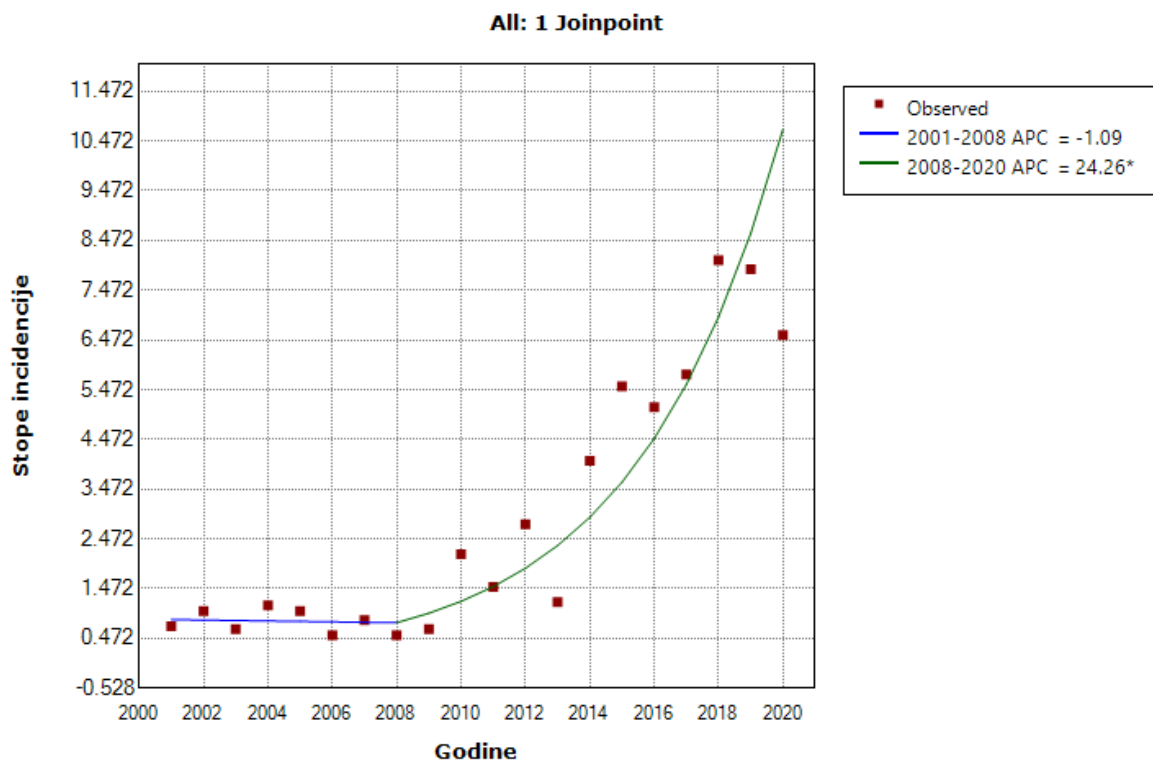
**Grafikon 1.** Trend incidencije (na 100.000) za sifilis, za oba pola, Beograd, 2001-2020. godine

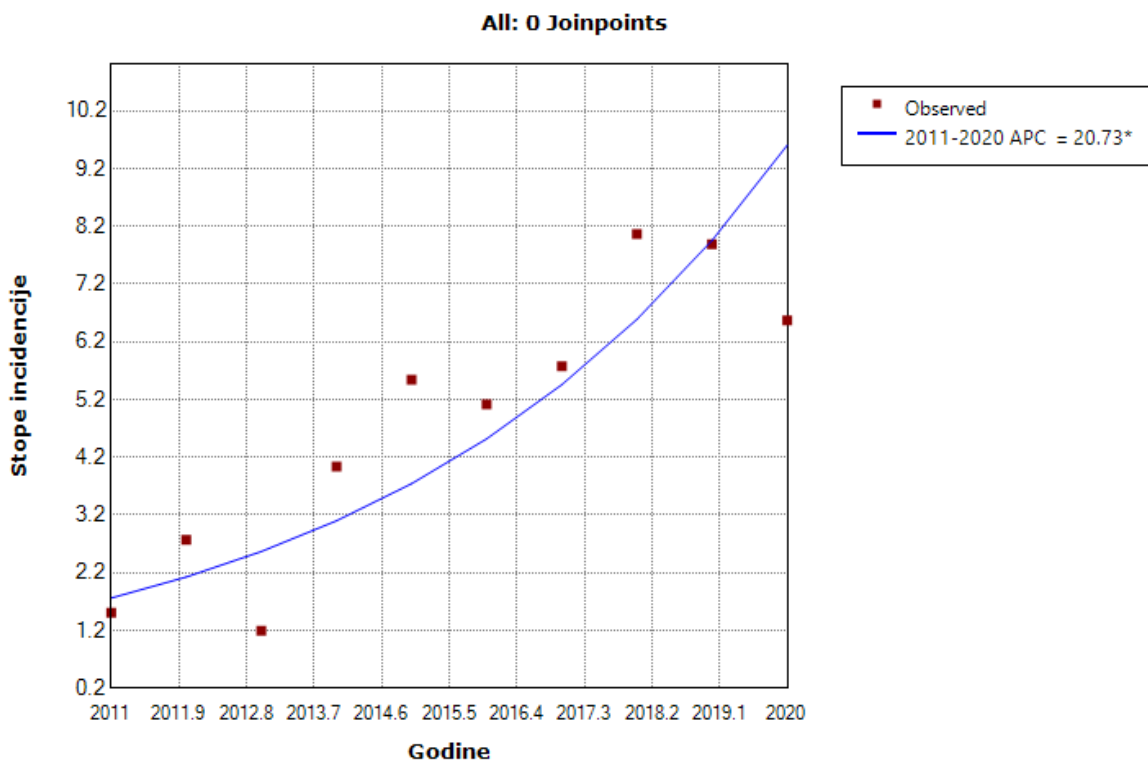
Table 1. Incidence rates of syphilis (per 100,000), total and by gender, Belgrade, 2001-2020

Years	Total	Males	Females
2001	0.7	/	/
2002	1.0	/	/
2003	0.7	/	/
2004	1.1	/	/
2005	1.0	/	/
2006	0.5	/	/
2007	0.8	/	/
2008	0.5	/	/
2009	0.7	/	/
2010	2.2	/	/
2011	1.5	2.8	0.3
2012	2.8	5.0	0.8
2013	1.2	2.3	0.2
2014	4.0	7.8	0.7
2015	5.5	11.1	0.6
2016	5.1	9.3	0.7
2017	5.8	11.7	0.5
2018	8.1	17.7	0.2
2019	7.9	15.4	1.1
2020	6.6	13.5	0.3



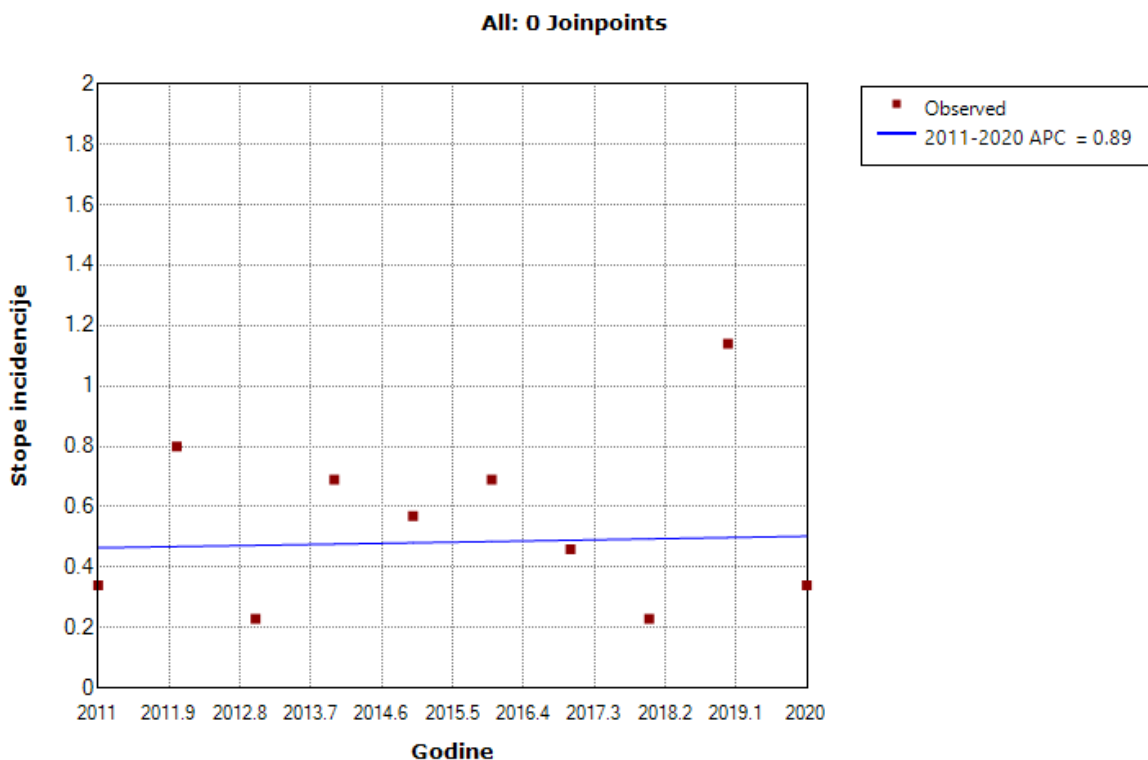
* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level
 Final Selected Model: 1 Joinpoint.

Figure 1. Incidence rates (per 100,000) trend for syphilis, for both genders, Belgrade, 2001-2020



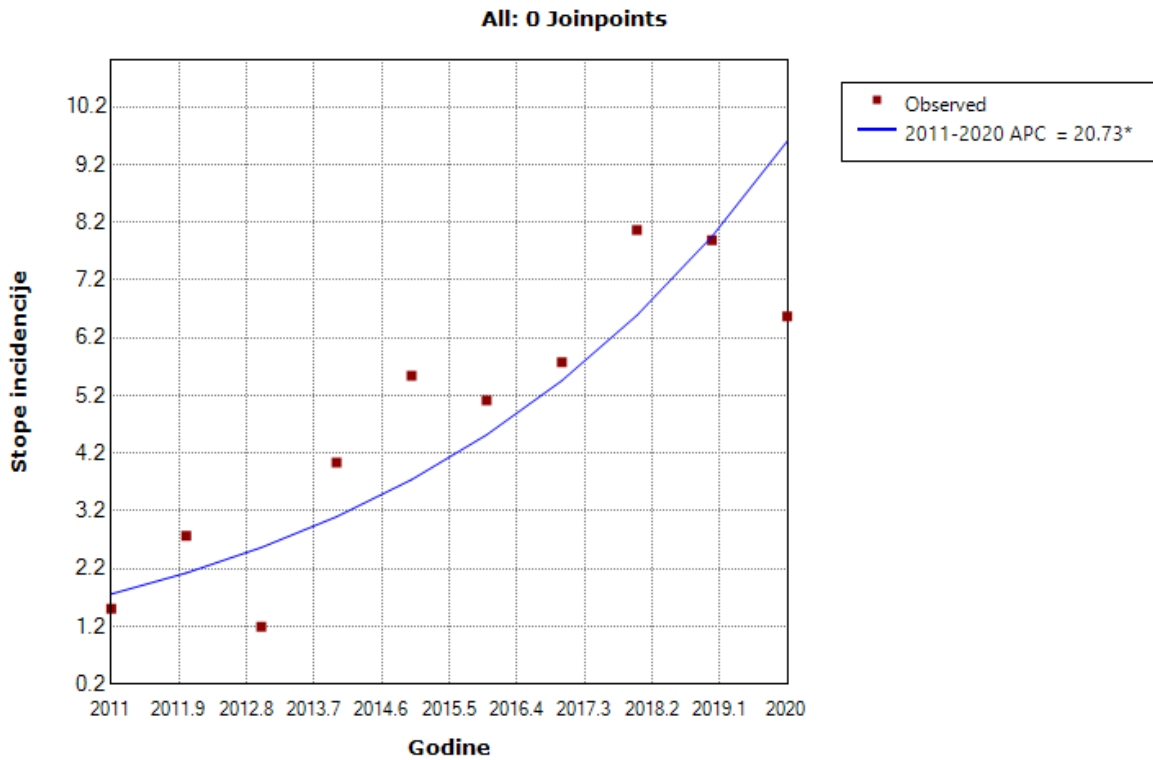
* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level
Final Selected Model: 0 Joinpoints.

Grafikon 2. Trend incidencije (na 100.000) za sifilis, muškarci, Beograd, 2011-2020. godine



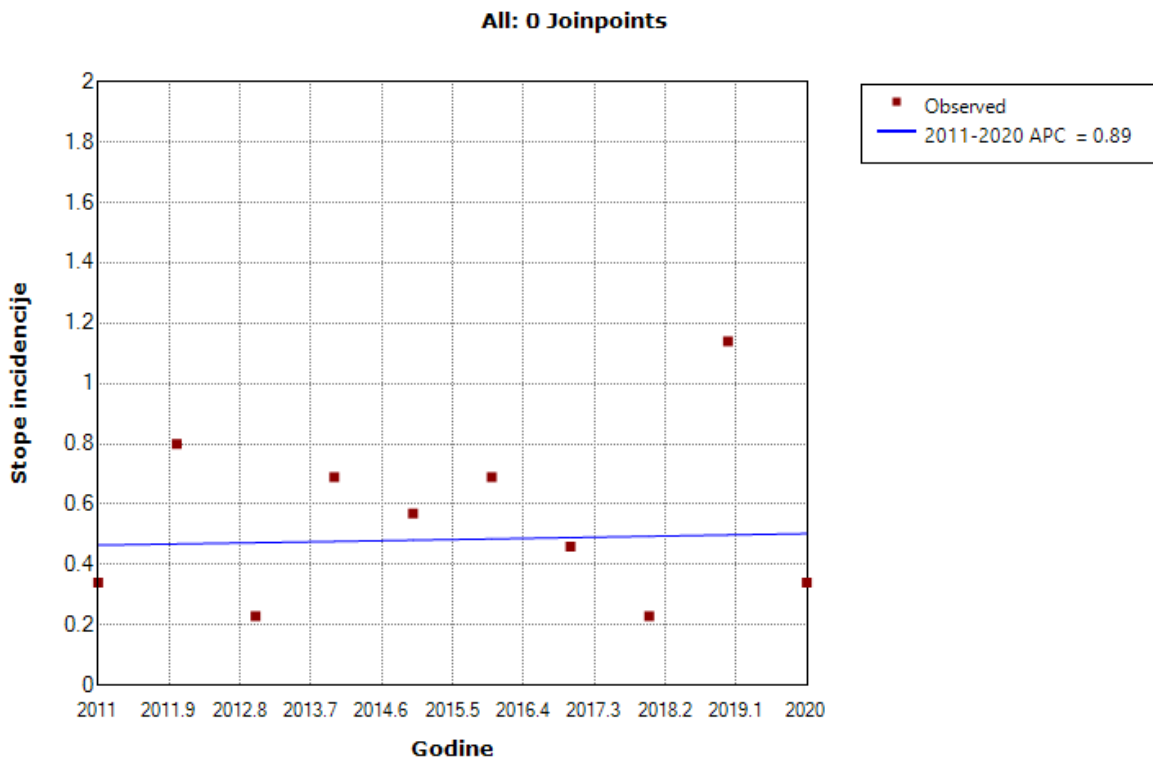
* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level
Final Selected Model: 0 Joinpoints.

Grafikon 3. Trend incidencije (na 100.000) za sifilis, žene, Beograd, 2011-2020. godine



* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level
 Final Selected Model: 0 Joinpoints.

Figure 2. Incidence rates (per 100,000) for syphilis, males, Belgrade, 2001-2020



* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level
 Final Selected Model: 0 Joinpoints.

Figure 3. Incidence rates (per 100,000) trend for syphilis, females, Belgrade, 2001-2020

Tabela 2. Ukupan broj novoobolelih od sifilisa i prosečna incidencija (na 100.000), po polu i uzrastu, i odnos polova, Beograd, 2001-2020. godine

Uzrasne grupe	Muškarci		Žene		Odnos polova Muškarci/Žene
	Broj slučajeva	Prosečna stopa incidencije	Broj slučajeva	Prosečna stopa incidencije	
<19	12	0,7	3	0,19	3,9
20-29	207	18,8	14	1,24	15,2
30-39	302	24,1	10	0,76	31,7
40-49	158	15,1	8	0,70	21,5
50-59	56	4,9	10	0,75	6,5
>60	20	1,2	3	0,1	11,9

209,8% (sa 6,1 na 100.000 u 2010. godini na 12,8 na 100.000 u 2019. godini) i neznatnog porasta kod žena (sa 1,3 na 100.000 u 2010. godini na 1,5 na 100.000 u 2019. godini) (12). Porast obolevanja je naročito zabeležen u populaciji muškaraca koji imaju seksualne odnose sa muškarcima (MSM). Naime, čak 74% registrovanih slučajeva pripadalo je ovoj populaciji, naročito u zemljama Zapadne Evrope gde je taj procenat iznosio preko 75%, dok je udeo obolelih iz MSM populacije u zemljama našeg okruženja (Mađarska i Rumunija) bio oko 20% (11).

Prema rezultatima našeg istraživanja u poslednjoj deceniji najveće stope sifilisa u Beogradu su zabeležene 2018. godine i iznosile su 8,1 novoobolelih na 100.000 stanovnika. Karakteristike trenda obolevanja od sifilisa u poslednjih deset godina (2011-2020) kod nas su u skladu sa rezultatima iz zemalja Evropske unije (11). Došlo je do porasta obolevanja među muškarcima za 482,1% (sa 2,8 na 100.000 u 2011. godini na 13,5 na 100.000 u 2020. godini), dok su stope incidencije kod žena ostale neizmenjeno niske (0,34 na 100.000). Kao i u Evropi, i u našoj sredini se znatan porast obolevanja od sifilisa registrovao u MSM populaciji (9). Ovo bi se moglo objasniti visokorizičnim seksualnim ponašanjem (seksualni odnosi bez upotrebe kondoma, veći broj seksualnih partnera, upotreba seksualizovanih droga), lakšim pronalaženjem seksualnih partnera preko mobilnih aplikacija i društvenih mreža, kao i upotrebom pre ekspanzije profilakse (PrEP) za HIV (13-15). Kao faktori udruženi sa obolevanjem od sifilisa u Evropi u heteroseksualnoj populaciji navode se promiskuitet, prostitucija, upotreba alkohola i droga, kao i socijalno ekonomski činioci poput siromaštva i statusa migranata i izbeglica (12).

Koinfekcija sifilisa i HIV-a zabeležena je kod 34% MSM osoba u Evropskoj uniji tokom 2019. godine (11). Podaci o karakteristikama obolelih MSM osoba od ranog sifilisa u Beogradu za period 2010-2014. godina pokazuju da je HIV koinfekcija registrovana kod 22,7% osoba (9). Česta udruženost ovih infekcija upućuje na neophodnost testiranja obolelih od sifilisa na HIV, kao i periodično testiranje na sifilis seksualno aktivnih osoba koje žive sa HIV infekcijom.

Najveće stope obolevanja od sifilisa kod muškaraca zabeležene su u zemljama Zapadne Evrope i u 2019. godini iznosile su 15 na 100.000, dok su kod žena najviše stope zabeležene u Bugarskoj i Mađarskoj (3 na 100.000) (11). Odnos obolelih muškaraca i obolelih žena (*Male/Female ratio*) kretao se od 15:1 u zemljama Zapadne Evrope do 2:1 u zemljama Istočne Evrope. Uzrasno specifične stope obolevanja od sifilisa su konstantno bile najveće u starosnoj grupi od 25 do 44 godina, a skoro su se udvostručile u grupama od 25 do 34 godine i od 35 do 44 godine (11). Rezultati našeg istraživanja su u skladu sa podacima iz Evrope. Naime, kod muškaraca su stope obolevanja od sifilisa najveće u starosnoj grupi od 30 do 39 godina, a kod žena u uzrastu od 20 do 29 godina, dok je prosečan odnos obolelih muškaraca i obolelih žena u periodu od 2011. do 2020. godine bio 16:1.

S obzirom na to da je sifilis u Beogradu najčešće registrovan među ženama u reproduktivnom periodu, antenatalni skrining na ovu infekciju je preporučljiv kod svih trudnica, naročito kod onih pod povećanim epidemiološkim rizikom (16).

Zaključak

U novom milenijumu zabeležen je porast trenda obolevanja od sifilisa u Beogradu. Iako se

Table 2. Total number of syphilis cases and average incidence (per 100.000) distributed by age, sex, and male to female ratio, Belgrade 2001-2020

Age group	Men		Women		Sex ratio Male/Female
	Number of cases	Average incidence	Number of cases	Average incidence	
<19	12	0.7	3	0.19	3.9
20-29	207	18.8	14	1.24	15.2
30-39	302	24.1	10	0.76	31.7
40-49	158	15.1	8	0.70	21.5
50-59	56	4.9	10	0.75	6.5
>60	20	1.2	3	0.1	11.9

Discussion

In 2019, 35,039 cases of early syphilis were registered in the countries of the European Union (19.2 cases per 100,000) (11). If the last decade in the period 2010-2019 is observed in the countries of the European Union, the incidence of syphilis in men increased by 209.8% (from 6.1 per 100,000 in 2010 to 12.8 per 100,000 in 2019) and there was a slight increase in women (from 1.3 per 100,000 in 2010 to 1.5 per 100,000 in 2019) (12). The increase in morbidity was particularly noted in the population of men who have sex with men (MSM). Namely, even 74% of the registered cases belonged to this population, especially in the countries of the Western Europe, where that percentage was over 75%, while the share of patients from the MSM population was around 20% in the surrounding countries (Hungary and Romania) (11).

According to the results of our research in the last decade, the highest rates of syphilis in Belgrade were registered in 2018 and they amounted to 8.1 new cases per 100,000 inhabitants. The characteristics of trends of syphilis in the last ten years (2011-2020) in our country are in accordance with the results from the countries of the European Union (11). The incidence increased in men by 482.1% (from 2.8 per 100,000 in 2011 to 13.5 per 100,000 in 2020), while the incidence rates in women were unchanged and stayed low (0.34 per 100,000). As in Europe, a significant increase in the incidence of syphilis was registered in the MSM population (9). This could be explained by high-risk sexual behavior (sex without condoms, more sexual partners, use of sexualized drugs), easier finding of sexual partners through mobile applications and social networks, as well as the use of pre-exposure prophylaxis (PrEP) for HIV (13-15).

Promiscuity, prostitution, alcohol and drug use, as well as socio-economic factors such as poverty and the status of migrants and refugees are cited as factors associated with syphilis in Europe in the heterosexual population (12).

The co-infection of syphilis and HIV was recorded in 34% of MSM in the European Union in 2019 (11). Data on the characteristics of MSM with early syphilis in Belgrade for the period 2010-2014 show that HIV co-infection was registered in 22.7% of people (9). The frequent association of these infections points to the necessity of testing syphilis patients for HIV, as well as periodical testing for syphilis of sexually active persons living with HIV infection.

The highest incidence rates of syphilis in men were registered in the countries of Western Europe and they amounted to 15 per 100,000 in 2019, while in women the highest rates were registered in Bulgaria and Hungary (3 per 100,000) (11). The male/female ratio ranged from 15:1 in Western European countries to 2:1 in Eastern European countries. The highest age-specific incidence rates of syphilis were constantly in the age group 25-44 years, and they almost doubled in the age groups 25-34 years and 35-44 years (11). The results of our research are consistent with data from Europe. Namely, the highest incidence rates of syphilis in men were in the age group 30-39 years, and in women in the age group 20-29 years, while the average male/female ratio was 16:1 in the period 2011-2020.

Given that syphilis in Belgrade was most often registered in women in the reproductive period, antenatal screening for this infection is recommended to all pregnant women, especially those at increased epidemiological risk (16).

radi o „staroj veneričnoj bolesti“, sifilis je i dalje česta bakterijska polno prenosiva infekcija u našoj sredini te su rana dijagnostika i terapija neophodne posebno među pripadnicima vulnerabilnih grupa za polne bolesti da bi se sprečilo širenje ovog oboljenja i nastanak komplikacija.

Konflikt interesa

Autori su izjavili da nema konflikta interesa.

Finansiranje

Istraživanje je finansirano sredstvima Ministarstva prosvete, nauke, i tehnološkog razvoja Republike Srbije (projekat broj 200110)

Reference

1. Rowlay J, Vander Hoorn S, Korenromp E, Low N, Unemo M, Abu-Raddad LJ et al. Chlamydia, gonorrhoea, trichomoniasis and syphilis: global prevalence and incidence estimates, 2016. *Bull World Health Organ* 2019; 97(8):548-562P. doi: 10.2471/BLT.18.228486
2. Mihajlović V. Istorija polnih bolesti u Srbiji do 1912. godine. Beograd: Štamparija Centralnog higijenskog zavoda; 1931:7
3. Opšta državna bolnica. Mesečni izveštaj Odeljenja za kožne bolesti i sifilis, januar 1890. *Arh Srb* 1890;(P 26).
4. Kujundžić V. Prostitucija u Beogradu i obavezna predohrana polnih bolesti. U: Subotić VM, Kujundžić V, urednici. I kongres srpskih lekara i prirodnjaka. Knjiga I. Beograd: SLD; 1905. p. 426-37.
5. Gradska poliklinika za kožne i venerične bolesti, Beogradske opštinske novine, br 3, godina LVI, Beograd, 1938.
6. Marjanović R, Lalošević J. Epidemiološko stanje sifilisa i gonoreje na teritoriji Beograda. *Srp Arch Celok Lek*. 1990;118: 37-42.
7. Marjanović R, Lalošević J, Veljković M. Ponavljana obolevanja od veneričnih bolesti kao epidemiološki i socijalnomedicinski problem. *Zdravst Zašt* 1988; 4:40-44.
8. Bjekić M, Vlajinac H, Šipetić S, Kocev N. Trends of gonorrhoea and early syphilis in Belgrade 1985-1999. *Sex Transm Infect*. 2001;77(5):387-388. doi: 10.1136/sti.77.5.387
9. Bjekić M, Šipetić-Grujičić S, Begović-Vuksanović B, Rafailović N, Vlajinac H. Syphilis resurgence in Belgrade, Serbia in the new millennium: an outbreak in 2014. *Centr Eur J Public Health*. 2017;25(4):277-81. doi: 10.21101/cejph.a4525.
10. Kim HJ, Fay MP, Feuer EJ, Midthune DN. Permutation tests for joinpoint regression with applications to cancer rates. *Stat Med*. 2000;19(3):335-51.
11. European Centre for Disease Prevention and Control. Syphilis. In: ECDC. Annual epidemiological report for 2019. Stockholm: ECDC; 2022.
12. European Centre for Disease Prevention and Control. Syphilis and congenital syphilis in Europe –A review of epidemiological trends (2007–2018) and options for response. Stockholm: ECDC; 2019.
13. Simms I, Wallace L, Thomas DR, Emmett L, Shankar AG, Vinson M, et al. Recent outbreaks of infectious syphilis, United Kingdom, January 2012 to April 2014. *Eurosurveill*. 2014;19(24):20833. doi: 10.2807/1560-7917.es2014.19.24.20833.
14. Goode D, Kennedy S, Evans A, Talbot A, Page E, Cronin M, et al. Increase in diagnoses of early infectious syphilis: Local outbreak or following the national trend? *Sex Transm Infect*. 2017;93:A82-A3. doi: 10.1097/OLQ.0000000000000945.
15. Beymer MR, DeVost MA, Weiss RE, Dierst-Davies R, Shover CL, Landovitz RJ, et al. Does HIV pre-exposure prophylaxis use lead to a higher incidence of sexually transmitted infections? A case-crossover study of men who have sex with men in Los Angeles, California. *Sex Transm Infect*. 2018;94(6):457-62. doi: 10.1136/sextrans-2017-053377.
16. Bjekić M. Sifilis u trudnoći. *Zdravstvena zaštita*. 2021;50(1):57-66. doi: 10.5937/zdravzast50-30653



License: This is an open access article under the terms of the Creative Commons Attribution 4.0 License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2023 Health Care.

Primljen: 18/06/2023. Revizija: 21.06.2023. Prihvaćen: 21.06.2023.

Conclusion

In the new millennium, an increase in the trend of morbidity of syphilis was registered in Belgrade. Although it is an “old venereal disease”, syphilis is still a common bacterial sexually transmitted infection in our environment, and early diagnosis and therapy are needed, especially among the members of vulnerable groups in order to prevent the spread of this disease and the occurrence of complications.

Competing interests

The authors declared no competing interests.

Funding

This research was funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia (Project No. 200110).

References

- Rowlay J, VanderHoorn S, Korenromp E, Low N, Unemo M, Abu-Raddad LJ et al. Chlamydia, gonorrhoea, trichomoniasis and syphilis: global prevalence and incidence estimates, 2016. *BullWorldHealth Organ* 2019; 97(8):548-562P.
- Mihajlović V. History of Venereal Diseases until 1912. Belgrade: Printing office of the Central Hygiene Institute; 1931:7
- General public hospital. Monthly report of the Department of skin diseases and syphilis, January 1890. *ArhSrb* 1890;(P 26).
- Kujundžić V. Prostitution in Belgrade and mandatory prevention of venereal diseases. in: Subotić VM, Kujundžić V, editors. I Congress of Serbian physicians and naturalists. Book I. Belgrade: SLD; 1905. p. 426-37.
- City Clinic for Skin and Venereal Diseases, Belgrade municipal newspapers, no. 3, year LVI, Belgrade, 1938.
- Marjanović R, Lalošević J. Epidemiological state of syphilis and gonorrhoea in the territory of Belgrade. *Srp arch celoklek* 1990;118: 37-42.
- Marjanović R, Lalošević J, Veljković M. Repeated infections of venereal diseases as the epidemiological and social-medical problem. *Health Care* 1988; 4: 40-44.
- Bjekić M, Vlajinac H, Šipetić S, Kocev N. Trends of gonorrhoea and early syphilis in Belgrade 1985-1999. *SexTransmInfect* 2001; 77 (5): 387-388.
- Bjekić M, Šipetić-Grujičić S, Begović-Vuksanović B, Rafailović N, Vlajinac H. Syphilis resurgence in Belgrade, Serbia in the new millennium: an outbreak in 2014. *CentrEur J PublicHealth*. 2017; 25 (4): 277-81.
- Kim HJ, Fay MP, Feuer EJ, Midthune DN. Permutation tests for joinpoint regression with applications to cancer rates. *Stat Med*. 2000 Feb 15;19(3):335–51.
- European Centre for Disease Prevention and Control. Syphilis. In: ECDC. Annual epidemiological report for 2019. Stockholm: ECDC; 2022.
- European Centre for Disease Prevention and Control. Syphilis and congenital syphilis in Europe –A review of epidemiological trends (2007–2018) and options for response. Stockholm: ECDC; 2019.
- Simms I, Wallace L, Thomas DR, Emmett L, Shankar AG, Vinson M, et al. Recent outbreaks of infectious syphilis, United Kingdom, January 2012 to April 2014. *Eurosurveill*. 2014;19(24):20833.
- Goode D, Kennedy S, Evans A, Talbot A, Page E, Cronin M, et al. Increase in diagnoses of early infectious syphilis: Local outbreak or following the national trend? *Sex TransmInfect*. 2017;93:A82-A3.
- Beymer MR, DeVost MA, Weiss RE, Dierst-Davies R, Shover CL, Landovitz RJ, et al. Does HIV pre-exposure prophylaxis use lead to a higher incidence of sexually transmitted infections? A case-crossover study of men who have sex with men in Los Angeles, California. *Sex Transm Infect*. 2018;94(6):457-62.
- Bjekić M. Syphilis in pregnancy. *Health Care* 2021; 50 (1): 57-66.



License: This is an open access article under the terms of the Creative Commons Attribution 4.0 License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2023 Health Care.

Received: 06/18/2023

Revised: 06/21/2023

Accepted: 06/21/2023