

POVEZANOST HEMSEKSA SA SEKSUALNIM PONAŠANJEM I POLNO PRENOSIVIM INFEKCIJAMA KOD MUŠKARACA KOJI IMAJU SEKSUALNE ODNOSI SA MUŠKARCIMA U BEOGRADU

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SAŽETAK

Uvod/Cilj: Hemseks je česta praksa među muškarcima koji imaju seksualne odnose sa muškarcima (MSM). Cilj ovog istraživanja bio je da se proceni prevalencija hemseksa među MSM populacijom u Beogradu i njegova povezanost sa njihovim ponašanjem i polno prenosivim infekcijama.

Metode: Studija preseka sprovedena je u dve zdravstvene ustanove u Beogradu i obuhvatila je 469 MSM osoba. Anonimnom anketom od svih ispitanika su prikupljeni podaci o demografskim karakteristikama, razlogu dolaska lekaru, seksualnoj anamnezi i upotrebi seksualizovanih droga u prethodnih šest meseci.

Rezultati: Od 469 ispitanika 123 (26,2%) je praktikovalo hemseks, a gama-hidroksibutirat (GHB) i gama-butirolakton (GBL) su bile najčešće korišćene seksualizovane droge (84,6%). Prema rezultatima multivarijantne logističke regresione analize učesnici koji su praktikovali hemseks značajno su se razlikovali od ostalih ispitanika u sledećim karakteristikama: češće su bili zaposleni (Unakrsni odnos – UO=2,50; 95% interval poverenja - 95%IP=1,19-5,26; p=0,015), imali su veći broj seksualnih partnera u poslednjih šest meseci (UO=1,39; 95%IP=1,14-1,72; p=0,002) i analne seksualne odnose bez upotrebe kondoma (UO=3,23; 95%IP=1,64-6,25; p=0,001), češće su praktikovali grupni seks tokom poslednjih šest meseci (UO=4,35; 95%CI=2,38-7,69; p<0,001), konzumirali su veće količine alkohola (UO=2,50; 95%CI=1,54-4,00; p<0,001) i češće su imali bakterijsku polno prenosivu infekciju u poslednjih godinu dana (UO=2,70; 95%CI=1,61-4,54; p<0,001). Učestalost upotrebe rekreativnih droga bila je ređa kod ispitanika koji su praktikovali hemseks (UO=0,59; 95%CI = 0,41-0,88; p=0,009).

Zaključak: MSM osobe koje su imale hemseks češće su praktikovale visoko rizično seksualno ponašanje i češće su obolevale od bakterijskih polno prenosivih infekcija. Rastući fenomen hemseksa među MSM populacijom zahteva podizanje svesti o problemima hemseksa kako među pripadnicima ove vulnerabilne populacije, tako i među zdravstvenim radnicima.

Cljučne reči: hemseks, MSM, seksualno ponašanje, polno prenosive infekcije

Uvod

Rekreativne droge predstavljaju (i)legalne hemijske supstance koje zbog svog psihoaktivnog dejstva izazivaju osećaj zadovoljstva i uživanja, umanjuju inhibicije ali sa druge strane uzrokuju i različite zdravstvene probleme i nastanak zavisnosti kod korisnika. Najčešće korišćeni su amfetamini, nitrati, kokain, marihuana, ekstazi i lekovi za lečenje erektilne disfunkcije (1), kao i takozvane seksualizovane droge – hemseks (engl. *chemsex*), naročito korišćene u populaciji muškaraca koji imaju seksu-

alne odnose sa muškarcima (MSM), pre ili u toku seksualnog odnosa, da bi pojačale seksualni učinak i zadovoljstvo (2). Hemseks u užem smislu obuhvata gama-hidroksibutirat (GHB- *gamma-hydroxybutyrate*) i gama-butirolakton (GBL- *gamma-butyrolactone*), kristalni metamfetamin i mefedron (2,3). Upotreba ovih droga povezana je sa visokorizičnim seksualnim ponašanjem i češćim prenošenjem polno prenosivih infekcija (PPI) (4). Sve veća upotreba novih psihoaktivnih supstanci u Evropi zahte-

CHEMSEX RELATED SEXUAL BEHAVIOURS AND SEXUALLY TRANSMITTED INFECTIONS AMONG MEN WHO HAVE SEX WITH MEN IN BELGRADE

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SUMMARY

Background/Aim: Chemsex is a common practice among men who have sex with men (MSM). The aim of this study was to assess the prevalence of chemsex in the MSM population in Belgrade and its association with their behaviour and sexually transmitted infections.

Methods: A cross-sectional study was conducted at two institutes in Belgrade over a six-month period and it covered 469 MSM. Data on demographic characteristics, reasons of attendance, sexual history, sexual behaviour and sexualized drugs use in the previous six months were collected from all participants by the use of a questionnaire.

Results: Chemsex was practiced by 123 (26.2%) participants and GHB/GBL was most commonly used (84.6%). According to the results of multivariate logistic regression analysis those practicing chemsex differed from other participants significantly, independently of other factors, in the following characteristics: they were more frequently employed (Odds Ratio – OR=2.50, 95% confidence interval – 95%CI=1.19-5.26, p=0.015), had a greater number of sex partners in the last six months (OR=1.39, 95%CI =1.14-1.72, p=0.002), had condomless anal sex (OR=3.23, 95%CI=1.64-6.25, p=0.001) and group sex more frequently in the last six months (OR=4.35, 95%CI= 2.38-7.69, p<0.001), used a greater quantity of alcohol (OR=2.50, 95%CI 1.54-4.00, p<0.001), and had bacterial STIs more frequently in the last year (OR=2.70, 95%CI=1.61-4.54, p<0.001). The frequency of recreational drugs use was lower in those engaged in chemsex (OR=0.59, 95%CI=0.41-0.88, p=0.009).

Conclusion: MSM engaged in chemsex practiced high risk sexual behaviour and suffered from bacterial sexually transmitted infections more frequently. The growing phenomenon of chemsex among MSM requires raising awareness about issues regarding chemsex both among the members of this vulnerable population and healthcare workers.

Key words: chemsex, men who have sex with men (MSM), sexual behaviour, sexually transmitted infections

Introduction

Recreational drugs are (il)legal chemical substances that, due to their psychoactive effect, cause the feeling of pleasure and enjoyment, reduce inhibitions, but on the other hand, they also cause various health problems and addiction in users. The most commonly used are amphetamines, nitrates, cocaine, marijuana, ecstasy and drugs used for the treatment of erectile dysfunction (1), as well as the so-called sexualized drugs – chemsex,

which are mostly used by the population of men who have sex with men (MSM), before or during sexual intercourse in order to enhance sexual performance and satisfaction (2). Chemsex in the narrower sense includes gamma-hydroxybutyrate (GHB) and gamma-butyrolactone (GBL), crystal methamphetamine and mephedrone (2,3). The use of these drugs is associated with high-risk sexual behavior and more frequent transmission

va proširenje liste seksualizovanih droga da se ne bi prevideo njihov uticaj na seksualno ponašanje i udruženost sa PPI (6). Neke rekreativne droge koje imaju povoljan uticaj na seksualno zadovoljstvo, poput popersa, marihuane i lekova koji se koriste za erektilnu disfunkciju ne ubrajaju se u hemseks zbog njihove česte upotrebe u različite svrhe (7).

Istraživanje sprovedeno u Republici Srbiji u toku 2014. godine je pokazalo da je 8% odrasle populacije uzrasta od 18 do 64 godine koristilo tokom života neku psihoaktivnu supstancu, a najčešće su je koristili muškarci (12,8%) starosne dobi od 18 do 34 godine (8). Marihuana je bila najčešće korišćena psihoaktivna supstanca, dok su se amfetamin, kokain i ekstazi veoma retko koristili u opštoj populaciji, a novije psihoaktivne supstance (NPS) poput ketamina i GHB je koristilo manje od 0,1% mlađih odraslih osoba (8). Upotreba NPS u Srbiji se registruje kod MSM osoba koje obično koriste GHB tokom seksualnih aktivnosti i kod mladih koji ih konzumiraju na žurkama i muzičkim festivalima (9).

S obzirom na to da nemamo podatke o učestalosti i vrstama rekreativnih droga koje se koriste među MSM populacijom u našoj zemlji, a posebno podatke o upotrebi seksualizovanih droga, cilj ovog istraživanja je bio da se utvrdi prevalencija hemseksa i njegova povezanost sa seksualnim ponašanjem i PPI među MSM populacijom u Beograd.

Metod

U studiju preseka u toku šestomesečnog perioda (1.08.2022–31.01.2023. godine) uključeni su pripadnici MSM populacije koji su došli na pregled u Gradski zavod za kožne i venerične bolesti u Beogradu i u ambulantu za HIV infekciju Infektivne klinike Kliničkog centra Srbije. Od svih ispitanika podaci su prikupljeni upitnikom. Upitnik je sadržao pitanja koja su se odnosila na njihove osnovne demografske karakteristike, HIV-status i eventualnu upotrebu preekspozicione profilakse za HIV (engl. *pre-exposure prophylaxis*, PrEP), seksualno ponašanje u poslednjih šest meseci, na podatke o lečenim bakterijskim PPI u poslednjih godinu dana, kao i o upotrebi rekreativnih droga tokom seksa u poslednjih šest meseci. Takođe su prikupljeni podaci o korišćenju ilegalnih droga u poslednjih šest meseci [(hemseks: GHB, GBL, ekstazi – 3,4-metilendioksimetamfetamine (engl. *Methylenedioxymethamphetamine* – MDMA), ketamin, mefedron, kristalni metamfetamin i am-

fetamin), ili druge rekreativne droge (oralni inhibitori fosfodiesteraze 5 za erektilnu disfunkciju, popers i marihuanu)] i o upotrebi intravenskih droga. Procena upotrebe alkohola u poslednjih godinu dana vršena je na osnovu skraćene verzije upitnika Svetske Zdravstvene Organizacije – AUDIT testa (engl. *Alcohol Use Disorders Identification Test*) (10) prema kojoj su ispitanici klasifikovani u tri grupe (manje rizično pijenje, rizično pijenje i visoko rizično pijenje).

Pacijentima sa simptomima polnih bolesti rađeni su testovi na gonoreju, hlamidijazu i sifilis. Ovi testovi su rađeni i kod pacijenata koji su bili izloženi PPI. Ispitanici koji nisu imali simptome PPI nego su došli zbog nekog drugog razloga (dermatološki problemi u anogenitalnoj regiji poput gljivične infekcije - *tinea cruris*, *lichen sclerosus*-a ili su došli na savetovanje) nisu bili testirani na polne bolesti. Gonoreja je dijagnostikovana identifikacijom intracelularnih diplokoka u leukocitima iz uretralnog sekreta obolelih, dok je uretralna hlamidijaza potvrđena pozitivnim PCR (engl. *Polymerase chain reaction*; polimeraza lančana reakcija) testom. Pozitivnim specifičnim treponemskim serološkim testom (engl. *Treponema Pallidum Haemagglutination Assay* – TPHA; *Treponema Pallidum* hemaglutinacioni test) i nespecifičnim treponemskim testom (engl. *Venerical Disease Research Laboratory* - VDRL; laboratorijski test za istraživanje veneričnih bolesti) postavljene su dijagnoze primarnog sifilisa, sekundarnog sifilisa i ranog latentnog sifilisa. Testovi za HIV i hepatitis nisu bili rađeni, ali svi naši ispitanici su znali svoj HIV status. Dozvolu za istraživanje odobrio je Etički odbor Gradskog zavoda za kožne i venerične bolesti u Beogradu (br. 1861/3).

U statističkoj analizi korišćene su univarijantna i multivarijantna logistička regresiona analiza. Sve varijable koje su prema rezultatima univarijantne logističke regresione analize bile povezane sa hemseksom na nivou statističke značajnosti $p \leq 0,1$ bile su uključene u multivarijantnu analizu, dok su varijable koje su bile ograničene samo na deo ispitivane populacije (upotreba PrEP-a, broj i učestalost upotrebe rekreativnih droga) jedna po jedna dodavane u nove modele multivarijantne analize. Metod selekcije bio je unazadni (engl. *backward*) *Wald* test, dok su sve p vrednosti bile bazirane na dvosmernom (engl. *two-tailed*) testu, a statistički značajnim smatrane su vrednosti $p < 0,05$. Softverski paket programa *IBM SPSS Statis-*

of sexually transmitted infections (STIs) (4). The increasing use of new psychoactive substances in Europe requires the expansion of the list of sexualized drugs so that their influence on sexual behavior and association with STIs would not be overlooked (6). Some recreational drugs that have a beneficial effect on sexual pleasure, such as poppers, marijuana, and drugs used for erectile dysfunction are not included in chemsex because of their frequent use for different purposes (7).

The research, which was conducted in the Republic of Serbia in 2014, showed that 8% of the adult population aged 18 to 64 used a psychoactive substance during their lifetime, while it was most frequently used by men (12.8%) aged 18 to 34 (8). Marijuana was the most frequently used psychoactive substance, while amphetamine, cocaine and ecstasy were very rarely used in the general population, and newer psychoactive substances (NPSs) such as ketamine and GHB were used by less than 0.1% of young adults (8). The use of NPSs in Serbia was registered among MSM who frequently used GHB during sexual activities and among young people who used it at parties and music festivals (9).

Given that we do not have data on the frequency and types of recreational drugs used in the population of MSM in our country, and especially data on the use of sexualized drugs, the aim of this study was to determine the prevalence of chemsex and its association with sexual behavior and STIs among MSM in Belgrade.

Methods

The members of the MSM population who came for an examination or to the counseling center for sexually transmitted diseases of the City Institute for Skin and Venereal Diseases in Belgrade and for the regular check-up in the outpatient clinic for HIV at the Clinic for Infectious Diseases of the Clinical Center of Serbia were included in a cross-sectional study during a six-month period (August 1, 2022–January 31, 2023). Data were collected from all respondents using a questionnaire. The anonymous questionnaire contained questions related to their basic demographic characteristics, HIV-status and eventual use of pre-exposure prophylaxis for HIV (English: pre-exposure prophylaxis, PrEP), sexual behavior in the last six months, data on treated bacterial PPIs in the last year, as well as the use of

recreational drugs during sex in the last six months. Also, data were collected on the use of illegal drugs in the last six months [(hemsex: GHB, GBL, ecstasy - 3,4-methylenedioxymethamphetamine (MDMA), ketamine, mephedrone, crystal methamphetamine and amphetamine), or other recreational drugs (oral phosphodiesterase 5 inhibitors for erectile dysfunction, poppers, and marijuana)] and on intravenous drug use. The assessment of alcohol use in the last year was carried out on the basis of a shortened version of the World Health Organization's AUDIT test (Alcohol Use Disorders Identification Test) (10), according to which the respondents were classified into three groups (low-risk drinking, risky drinking and high-risk drinking).

All patients who had symptoms of STIs were tested for gonorrhoea, chlamydia and syphilis. These tests were also performed for patients who were exposed to PPIs. Those participants who did not have the symptoms of STIs but came due to some other reasons (dermatological problems in the anogenital region such as fungal infections – *tinea cruris*, *lichen sclerosus* or came for counseling) were not tested for STDs. Gonorrhoea was diagnosed by identifying intracellular diplococci in leukocytes from the urethral secretions of patients, while urethral chlamydia was confirmed by a positive PCR (Polymerase chain reaction) test. A positive specific treponema serological test (Treponema Pallidum Hemagglutination Assay - TPHA) and a non-specific treponema test (Venereal Disease Research Laboratory - VDRL) were used for diagnosing primary, secondary and early latent syphilis. Tests for HIV and hepatitis were not performed, but all our subjects knew their HIV status. The permit for the research was approved by the Ethics Committee of the City Institute for Skin and Venereal Diseases in Belgrade (No. 1861/3).

Univariate and multivariate logistic regression analysis were used in the statistical analysis of differences between participants who practiced chemsex and those who did not. All variables, which were associated with chemsex at the level of statistical significance $p < 0.1$ according to the results of univariate analysis, were included in the multivariate analysis. The variables, which were limited only to one part of the examined population, such as PrEP, the number of recreational drugs and frequency of their use

tics for Windows, version 23 (Armonk, NY, IBM Corp.) je korišćen za analizu baze podataka.

Rezultati

U studiju je uključeno 469 MSM osoba, od kojih je 48,6% koristilo neku rekreativnu drogu, a prevalencija hemseksa je iznosila 26,2%. Najveći broj ispitanika je koristio popers (23,7%), zatim GHB/GBL (22,2%), marihuanu (21,1%) i lekove za erektilnu disfunkciju (16,2%). Upotreba ostalih droga poput ketamina, metamfetamina, kokaina, MDMA i amfetamina je registrovana u manjem procentu od 1,9% do 7,5% (Grafikon 1).

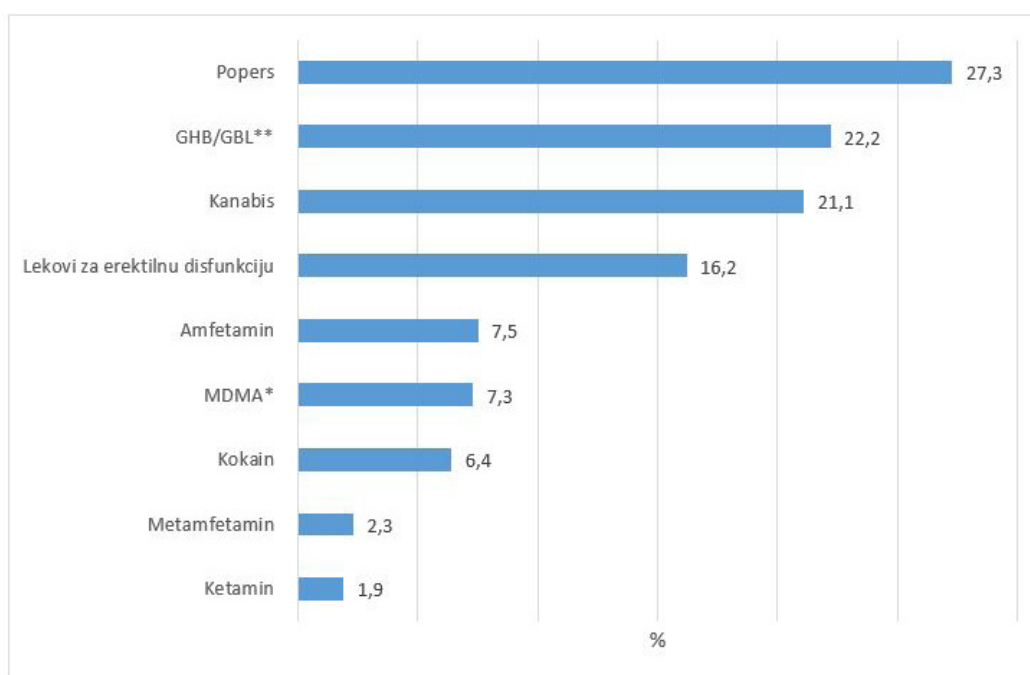
Najveći broj ispitanika je bio starosne dobi između 26 i 45 godina (70,4%), a procenat onih sa nižim i višim stepenom obrazovanja je bio sličan (49,9% vs. 50,1%), dok je 79,7% ispitanika bilo zaposleno (Tabela 1). Prema rezultatima univarijantne logističke regresione analize ispitanici koji su praktikovali hemseks (122) u odnosu na one koji ga nisu praktikovali (346 ispitanika) su bili statistički značajno češće zaposleni ($p<0,001$), dolazili su kod lekara usled simptoma PPI ili podatka o izlaganju PPI ($p<0,002$), konzumirali su veće količine alkohola ($p<0,001$) i veći broj rekreativnih droga ($p<0,001$). Osobe koje su praktikovale hemseks su češće bile HIV pozitivne ($p=0,053$) i češće su koristile PrEP ($p<0,001$). S druge strane ovi ispitanici su znatno ređe koristili droge u toku poslednjih šest

meseci u poređenju sa ispitanicima koji nisu praktikovali hemseks ($p=0,007$). Ispitanici u poređenim grupama nisu se razlikovali prema uzrastu, obrazovanju i podatku o tome kada su imali poslednji seksualni odnos bez upotrebe droga – „sober seks“ (Tabela 1).

Prema rezultatima prikazanim u Tabeli 2, ispitanici koji su praktikovali hemseks, u poređenju sa onima koji ga nisu praktikovali, tokom poslednjih šest meseci imali su veći broj seksualnih partnera ($p<0,001$), analne seksualne odnose bez upotrebe kondoma ($p<0,001$), učestvovali su u grupnom seksu ($p<0,001$), imali su neku bakterijsku PPI u poslednjih godinu dana ($p<0,001$), novodijagnostikovanu bakterijsku PPI ($p<0,001$) i češće su pripadali osobama sa ponovnim PPI – imali su više od jedne bakterijske PPI u poslednjih godinu dana ($p<0,001$).

Od bakterijskih PPI kod svih ispitanika sifilis je bio najčešće dijagnostikovano – 122 (26%), potom gonoreja (kod 41 ispitanika – 8,9%) i hlamidijaza (kod 16 ispitanika – 3,5%). Od ostalih PPI genitalne bradavice su dijagnostikovane kod 22 (4,8%) pacijenta, majmunske boginje kod 6 (1,3%), *moluscum contagiosum* infekcija kod 3 (0,6%) i genitalni herpes kod 1 (0,2%) pacijenta.

Rezultati multivarijantne logističke regresione analize su prikazani u Tabeli 3. U odnosu na osobe koje nisu praktikovale hemseks, ispitanici koji su



MDMA (ekstazi – 3,4-metilendioksimetamfetamine); GHB/GBL (gama-hidroksibutirat/gama-butirolakton)

Grafikon 1. Prevalencija (%) upotrebe rekreativnih droga tokom poslednjih 6 meseci među 469 muškaraca koji su imali seksualne odnose sa muškarcima

were added one by one to the new models of multivariate analysis. The selection method was the backward Wald test. All p values were based on the two-tailed test, while the values of $p < 0.05$ were considered to be statistically significant. The software package IBM SPSS Statistics for Windows, version 23 (Armonk, NY, IBM Corp.) was used for the analysis of database.

Results

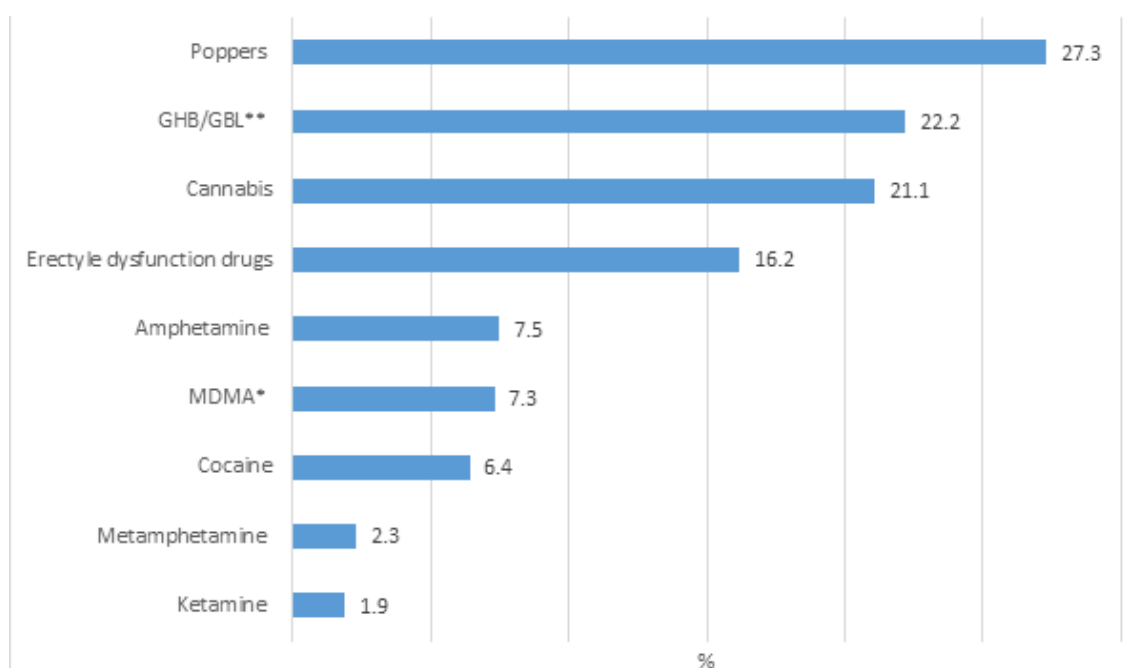
469 MSM were included in the study, 48.6% of whom used recreational drugs, while the prevalence of chemsex was 26.2%. The largest number of participants used poppers (23.7%), followed by GHB/GBL (22.2%), marijuana (21.1%) and drugs for erectile dysfunction (16.2%). The use of other drugs such as ketamine, methamphetamine, cocaine, MDMA and amphetamine was registered in smaller percentages, from 1.9% to 7.5% (Graph 1).

The largest number of participants belonged to the age groups between 26 and 45 years (70.4%), while the percentage of those participants with a lower and higher level of education was similar (49.9% vs. 50.1%), while 79.7% of respondents were employed (Table 1). According to the results of univariate logistic regression analysis, the participants who practiced chemsex (122) in comparison to those who did not practice it (346 respondents) were more often employed and it

was statistically significant ($p < 0.001$), came to the doctor due to the symptoms of STIs or data on the exposure to STIs ($p < 0.002$), they consumed greater amounts of alcohol ($p < 0.001$) and a larger number of recreational drugs ($p < 0.001$). Persons who practiced chemsex were more often HIV positive ($p = 0.053$) and they used PrEP more often ($p < 0.001$). On the other hand, these participants used drugs significantly less often during the last six months compared to those respondents who did not practice chemsex ($p = 0.007$). The participants in the compared groups did not differ according to age, education and data related to the fact when they had the last sexual intercourse without the use of drugs – “sober sex” (Table 1).

According to the results shown in Table 2, the participants who practiced chemsex in comparison to those who did not practice it in the last six months had a higher number of sexual partners ($p < 0.001$), anal sexual relations without using a condom ($p < 0.001$), participated in group sex ($p < 0.001$), had some bacterial sexually transmitted infection in the last year ($p < 0.001$), newly diagnosed bacterial STI ($p < 0.001$) and they belonged to persons with repeated STIs – had more than one bacterial STI in the last year ($p < 0.001$).

Of all bacterial STIs in all participants, syphilis was most often diagnosed – 122 (26%), followed by gonorrhoea (in 41 participants – 8.9%) and



MDMA (ecstasy – 3,4- Methylendioxyamphetamine); GHB/GBL (gamma-hydroxybutyrate)/gamma-butyrolactone)

Figure 1. Prevalence (%) of individual recreational drug use in the past six months among 469 males who have sex with males

Tabela 1. Distribucija ispitanika koji su praktikovali hemseks i onih koji nisu u odnosu na sociodemografske i neke druge karakteristike

Varijable	Ispitanici koji su praktikovali hemseks* (n=123) Broj (%)	Ispitanici koji nisu praktikovali hemseks (n=346) Broj (%)	p vrednost**
Uzrast (godine):			
≤ 25	13 (10,6)	61 (17,6)	0,499
26-35	52 (42,3)	117 (33,8)	
36-45	52 (42,3)	109 (31,5)	
45+	6 (4,9)	59 (17,1)	
Dužina trajanja obrazovanja (godine):			
≤ 12	58 (47,2)	176 (50,9)	0,480
>12	65 (52,8)	170 (49,1)	
Zaposlenost	111 (90,2)	263 (76,0)	<0,001
Razlog posete lekaru:			
Simptomi PPI	46 (37,4)	83 (24,0)	0,002
Izloženost PPI	26 (21,1)	54 (15,6)	
Simptomi nezvani sa PPI	51 (41,5)	209 (60,4)	
Konzumiranje alkohola u poslednjih godinu dana#:			
Manje rizično pijenje	73 (59,3)	272 (78,6)	<0,001
Rizično pijenje	45 (36,6)	72 (20,8)	
Visoko rizično pijenje	5 (4,1)	2 (0,6)	
Broj rekreativnih droga korišćenih u poslednjih šest meseci*:			
1	19 (15,4)	80 (23,1)	<0,001
2	28 (22,0)	21 (6,1)	
3 – 8	76 (62,6)	4 (1,2)	
Učestalost upotrebe rekreativnih droga u poslednjih šest meseci:			
Jednom mesečno	76 (61,8)	53 (15,3)	0,007
2-4 puta mesečno	36 (29,3)	27 (7,8)	
2-3 puta nedeljno	9 (7,3)	19 (5,5)	
≥ 4 puta mesečno	2 (1,6)	6 (1,7)	
Poslednji seksualni odnos bez upotrebe droga (engl. <i>sober sex</i>):			
Prošlog meseca	85 (69,1)	78 (22,5)	0,397
Pre više od 3 meseca	20 (16,3)	16 (4,6)	
Pre više od 6 meseci	9 (7,3)	4 (1,1)	
Pre više od godinu dana	9 (7,3)	7 (2,0)	
HIV pozitivan status	60 (48,8)	134 (38,7)	0,053
Upotreba PrEP-a	11/63 (17,5)	9/212 (4,2)	<0,001

PPI – polno prenosive infekcije; HIV – virus humane imunodeficijencije; PrEP – Pre-ekspoziciona profilaksa za HIV. *Upotreba jedne ili više seksualizovanih droga (GHB/GBL, kristalni metamfetamin, mefedron, ekstazi, amfetamin, kokain i ketamin); **Prema rezultatima univarijantne logističke regresione analize; #Konzumiranje alkohola je bazirano prema odgovorima na prva dva pitanja iz skraćenog upitnika Svetske zdravstvene organizacije AUDIT (engl. *Alcohol Use Disorders Identification Test*, test za identifikaciju poremećaja upotrebe alkohola); Manje rizično pijenje alkohola: skor ≤1, rizično pijenje: skor >1 prema drugom pitanju iz upitnika i visoko rizično pijenje: skor ≥6 (10); ≠ Upotreba hemseksa i/ili nekih drugih rekreativnih droga: kanabis, popers I lekovi za erektilnu disfunkciju;

praktikovali hemseks su bili značajno češće zaposleni (UO=2,50; 95%IP=1,19-5,26; p=0,015), imali su veći broj seksualnih partnera u poslednjih šest meseci (UO=1,39; 95%IP=1,14-1,72; p=0,002), češće su praktikovali analne seksualne odnose bez

upotrebe kondoma (UO=3,23; 95%IP=1,64-6,25; p=0,001) i grupni seks tokom poslednjih šest meseci (UO=4,35; 95%IP=2,38-7,69; (p<0,001), konzumirali su veću količinu alkohola (UO=2,50; 95%IP=1,54-4,00; (p<0,001) i češće su imali neku bakterijsku PPI

Table 1. Distribution of participants who practiced chemsex and those who did not according to socio-demographic and some other characteristics

Variable	Engaged in chemsex* (n=123) No (%)	Not engaged in chemsex (n=346) No (%)	p value**
Age groups (years):			
≤ 25	13 (10.6)	61 (17.6)	0.499
26-35	52 (42.3)	117 (33.8)	
36-45	52 (42.3)	109 (31.5)	
45+	6 (4.9)	59 (17.1)	
Education (years):			
≤ 12	58 (47.2)	176 (50.9)	0.480
>12	65 (52.8)	170 (49.1)	
Employed	111 (90.2)	263 (76.0)	<0.001
Reason for visiting a doctor:			
STI related symptoms	46 (37.4)	83 (24.0)	0.002
STI exposure	26 (21.1)	54 (15.6)	
No STI related symptoms	51 (41.5)	209 (60.4)	
Alcohol consumption in the last year[#]:			
Low risk drinking	73 (59.3)	272 (78.6)	<0.001
Hazardous drinking	45 (36.6)	72 (20.8)	
High risk drinking	5 (4.1)	2 (0.6)	
Number of recreational drugs used in the last six months[†]:			
1	19 (15.4)	80 (23.1)	<0.001
2	28 (22.0)	21 (6.0)	
3 – 8	76 (62.6)	4 (1.1)	
Frequency of recreational drug use in the last six months:			
Once per month	76 (61.8)	53 (15.3)	0.007
2-4 times per month	36 (29.3)	27 (7.8)	
2-3 times per week	9 (7.3)	19 (5.5)	
≥ 4 times per week	2 (1.6)	6 (1.7)	
The last sober sex[‡] among drug users:			
Last month	85 (69.1)	78 (22.5)	0.397
Before more than 3 months	20 (16.3)	16 (4.6)	
Before more than 6 months	9 (7.3)	4 (1.1)	
Before a year	9 (7.3)	7 (2.0)	
HIV positive	60 (48.8)	134 (38.7)	0.053
On PrEP	11/63 (17.5)	9/212 (4.2)	<0.001

STI – Sexually Transmitted Infection; HIV – Human Immunodeficiency Viruses; PrEP – Pre-Exposure Prophylaxis of HIV.*Use of one of more of GHB/GBL, crystal methamphetamine, mephedrone, ecstasy, amphetamine, cocaine and ketamine. **According to univariate logistic regression analysis. #Alcohol consumption is based on the first two questions of the WHO AUDIT questionnaire. Lower risk drinking is indicated by a score ≤1, hazardous drinking is indicated by a score >1 on question 2 and higher risk drinking is indicated by a score ≥6 (10);* Use of chemsex and/or some other recreational drugs: cannabis, poppers and erectile dysfunction drugs; ‡ Sex without the drugs

chlamydia (in 16 participants -3.5%). Of the other STIs, genital warts were diagnosed in 22 (4.8%) patients, monkey pox in 6 (1.3%), molluscum contagiosum in 3 (0.6%) and genital herpes in 1 patient (0.2%).

The results of multivariate logistic regression analysis are shown in Table 3. In comparison

to persons who did not practice chemsex, the participants who practiced chemsex were significantly more often employed (OR=2.50; 95%CI=1.19-5.26; p=0.015), had a higher number of sexual partners in the last six months (OR = 1.39; 95%CI=1.14-1.72; p=0.002), they practiced anal sex without using a condom more often (OR

Tabela 2. Distribucija ispitanika koji su praktikovali hemseks i onih koji nisu u odnosu na seksualnu aktivnost, rizično seksualno ponašanje i dijagnozu bakterijske PPI

Varijable	Ispitanici koji su praktikovali hemseks* (n=123) Broj (%)	Ispitanici koji nisu praktikovali hemseks (n=346) Broj (%)	p vrednost**
Broj seksualnih partnera u poslednjih šest meseci:			
1-3	29 (23,6)	188 (54,3)	<0,001
4-9	39 (31,7)	101 (29,2)	
10+	55 (44,7)	57 (16,5)	
Analni seks bez upotrebe kondoma u poslednjih šest meseci	109 (88,6)	213 (6,6)	<0,001
Grupni seks u poslednjih šest meseci	72 (58,5)	50 (14,5)	<0,001
Bakterijske PPI u poslednjih godinu dana	65 (52,8)	90 (26,0)	<0,001
Novodijagnostikovana bakterijska PPI	65 (52,8)	113 (32,7)	<0,001
Ponovno obolevanje od bakterijske PPI	34 (27,6)	25 (7,2)	<0,001

PPI – polno prenosive infekcije; *Upotreba jedne ili više seksualizovanih droga (GHB/GBL, kristalni metamfetamin, mefedron, ekstazi, amfetamin, kokain i ketamin); **Prema rezultatima univarijantne logističke regresione analize

u poslednjih godinu dana (UO=2,70; 95%IP=1,61-4,54; p<0,001). Učestalost upotrebe rekreativnih droga je bila niža kod osoba koje su praktikovale hemseks (UO=0,59; 95%IP=0,41-0,88; p=0,009).

Diskusija

Iako je sproveden veliki broj istraživanja o prevalenciji hemseksa među MSM populacijom, njihove rezultate je teško porediti zbog različitih metoda istraživanja kako u odnosu na definisanje seksualizovanih droga (uži ili širi smisao), tako i u odnosu na karakteristike ispitanika (pripadnici opšte MSM populacije ili pacijenti klinika za polne bolesti). Sistematski pregled literature pokazuje da se prevalencija hemseksa među MSM populacijom kreće od 10% do 94% (2). Prema rezultatima našeg

istraživanja 26,2% MSM ispitanika je praktikovalo hemseks, što je u korelaciji sa rezultatima drugih istraživanja sprovedenih među pacijentima klinika za polne bolesti.

Među MSM osobama koje su posetile klinike za polne bolesti u Dublinu 27% je praktikovalo hemseks (11), a u Velikoj Britaniji 21,8% pacijenata (1). Nešto manji procenat MSM osoba koje su praktikovale hemseks registrovan je među pacijentima klinika za polne bolesti u Amsterdamu – 17,6% (12) i Oslu – 17% (13). U našem istraživanju najveći broj ispitanika (84,6%) je koristilo GHB/GBL. Većina studija je opisala da je među korisnicima usluga klinika za polne bolesti ova droga najčešće praktikovana i to kod 57% pacijenata u Dublinu (11), 56% u Brajtonu (14) i 93% u Amsterdamu

Tabela 3. Rezultati multivarijantne logističke regresione analize* (ispitanici koji su praktikovali hemseks vs. ispitanici koji nisu praktikovali hemseks)

Varijable	Unakrsni odnos	95% interval poverenja	p vrednost*
Zaposlenost	2,50	1,19-5,26	0,015
Broj seksualnih partnera u poslednjih šest meseci	1,39	1,14-1,72	0,002
Analni seks bez upotrebe kondoma u poslednjih šest meseci	3,23	1,64-6,25	0,001
Grupni seks u poslednjih šest meseci	4,35	2,38-7,69	<0,001
Konzumiranje alkohola u poslednjih godinu dana	2,50	1,54-4,00	<0,001
Bakterijska PPI u poslednjih godinu dana	2,70	1,61-4,54	<0,001
Učestalost upotrebe rekreativnih droga	0,59	0,41-0,88	0,009

PPI – polno prenosive infekcije; *Prema rezultatima multivarijantne logističke regresione analize

Table 2. Distribution of participants who practiced chemsex and those who did not according to their sexual activity, sexual risk behaviours and diagnosis of bacterial STI

Variable	Engaged in chemsex* (n=123) No (%)	Not engaged in chemsex (n=346) No (%)	p value**
Number of sex partners in the last six months:			
1-3	29 (23.6)	188 (54.3)	<0.001
4-9	39 (31.7)	101 (29.2)	
10+	55 (44.7)	57 (16.5)	
Condomless anal sex in the last six months	109 (88.6)	213 (6.6)	<0.001
Group sex in the last six months	72 (58.5)	50 (14.5)	<0.001
Bacterial STI diagnosis in the last year	65 (52.8)	90 (26.0)	<0.001
Current bacterial STI diagnosis	65 (52.8)	113 (32.7)	<0.001
Recurrent bacterial STI	34 (27.6)	25 (7.2)	<0.001

STI - Sexually Transmitted Infections; *Use of one of more of GHB/GBL, crystal methamphetamine, mephedrone, ecstasy, amphetamine, cocaine and ketamine. **According to univariate logistic regression analysis

= 3.23; 95CI=1.64-6.25; p=0.001) and group sex during the last six months (OR=4.35; 95%CI=2.38-7.69; (p < 0.001), consumed a greater amount of alcohol (OR=2.50; 95%CI=1.54-4.00; (p<0.001) and they had more often one of STIs in the last year (OR=2.70; 95%CI=1.61-4.54; p < 0.001). The frequency of recreational drug use was lower in persons who practiced chemsex (OR = 0.59; 95%CI 0.41-0.88; p = 0.009).

Discussion

Although a large number of studies have been conducted on the prevalence of chemsex in the population of MSM, their results are difficult to compare due to different study methods related to the definition of sexualized drugs (narrower or broader sense), as well as related to the characteristics of participants (members of the

general MSM population or patients from clinics for sexually transmitted diseases). A systematic literature review has shown that the prevalence of chemsex in the MSM population ranges from 10% to 94% (2). According to the results of our study, 26.2% of MSM practiced chemsex, which is in correlation with the results of other studies conducted among patients from clinics for venereal diseases.

Among MSM who visited clinics for venereal diseases in Dublin, 27% practiced chemsex (11), and in Great Britain 21.8% of patients (1). A slightly smaller percentage of MSM who practiced chemsex, was registered among patients from clinics for venereal diseases in Amsterdam – 17.6% (12), and Oslo – 17% (13). In our study, the largest number of participants (84.6%) used GHB/GBL. The majority of studies described that this drug was

Table 3. Results of multivariate logistic regression analysis* (participants who practiced chemsex vs. participants who did not practice it)

Varijable	Unakrsni odnos	95% interval poverenja	p vrednost*
Employed	2.50	1.19-5.26	0.015
Number of sex partners in the last six months	1.39	1.14-1.72	0.002
Condomless anal sex in the last six months	3.23	1.64-6.25	0.001
Group sex in the last six months	4.35	2.38-7.69	<0.001
Alcohol consumption	2.50	1.54-4.00	<0.001
Bacterial STI diagnosis in the last year	2.70	1.61-4.54	<0.001
Frequency of recreational drug use	0.59	0.41-0.88	0.009

STI – Sexually transmitted infection; *According to the results of multivariate logistic regression analysis

(12). Podaci iz istraživanja sprovedenog u Australiji pokazali su da je samo 5,4% MSM osoba koristilo GHB/GBL (15). Iako je upotreba amfetamina zabeležena kod samo 2,3% naših ispitanika, ova droga je na drugom mestu po učestalosti upotrebe tokom hemseksa – koristi je i do 22% osoba (16) a najčešće se unosi intravenskim putem (17). Prema rezultatima našeg istraživanja niko od ispitanika nije upotrebljavao intravenske droge u toku poslednjih šest meseci.

GHB/GBL predstavlja noviju psihoaktivnu supstancu u Republici Srbiji koja je veoma popularna među MSM populacijom (9). I pored pozitivnih efekata na seksualno ponašanje (povećava seksualno zadovoljstvo i redukuje inhibicije) ova droga može izazvati zavisnost a predoziranje je praćeno povraćanjem, problemima sa disanjem, halucinacijama i gubitkom svesti, a može nastupiti i smrt (18). S obzirom na to, lekari i korisnici ove droge u našoj sredini bi trebalo da budu dobro upoznati sa njenim neželjenim dejstvima.

Upotreba većeg broja droga (tri ili više) tokom hemseksa je registrovana kod 62,6% naših ispitanika i predstavlja prediktor za visoko rizično seksualno ponašanje i PPI (19). *Sewell* i saradnici (1) su opisali u svojoj studiji da je 25% MSM osoba koristilo veći broj droga. Istraživanje sprovedeno u Velikoj Britaniji među 1.138 MSM osoba je pokazalo da je 47% ispitanika koristilo tri i/ili više droga, a čak 21% je koristilo pet i/ili više različitih psihoaktivnih supstanci (19).

Prema rezultatima našeg istraživanja osobe koje su praktikovale hemseks u odnosu na one koje ga nisu praktikovale su bile znatno češće zaposlene, imale su veći broj seksualnih partnera u toku prethodnih šest meseci, praktikovale su grupni seks i analne seksualne odnose bez upotrebe kondoma, konzumirale su veće količine alkohola i znatno češće imale neku bakterijsku PPI u poslednjih godinu dana. Jedino je učestalost upotrebe rekreativnih droga bila manja u grupi osoba koje su praktikovale hemseks.

Podatak da su korisnici hemseksa bili znatno češće zaposleni i imali redovan prihod mogla bi objasniti njihovu veću mogućnost da nabave droge. Visok stepen zaposlenosti MSM osoba koje praktikuju hemseks registrovan je i u Velikoj Britaniji – 79,7% (1) i Norveškoj – 83,9% (14).

Prema našim rezultatima MSM osobe koje su praktikovale hemseks imale su visoko rizično seksualno ponašanje i češće su obolevale od bakteri-

jske PPI u toku poslednjih godinu dana što je u korelaciji sa podacima iz literature (1,6,11-13). *Glynn* i saradnici (11) su opisali da je $\frac{1}{3}$ MSM osoba koje su praktikovale hemseks imala više od 10 partnera tokom prethodne godine i nije koristila kondom tokom analnog seksualnog odnosa. Prema podacima *Druckler*-a i saradnika 42,4% osoba koje su praktikovale hemseks u Amsterdamu je imala više od 16 partnera tokom poslednjih šest meseci i 84,3% njih nije koristilo kondom za analni seks (12). Istraživanje sprovedeno u Oslu je pokazalo da je 60% MSM osoba koje su praktikovale hemseks imalo preko 11 seksualnih partnera tokom prethodnih godinu dana a 84% njih je učestvovalo u grupnom seksu (13). Naši ispitanici koji su praktikovali hemseks su češće bili HIV pozitivni, koristili su PrEP i posetili su našu ustanovu zbog simptoma PPI ili izlaganja PPI. Ovo je u skladu sa rezultatima iz Amsterdama gde je $\frac{1}{3}$ osoba koje su praktikovale hemseks bila HIV pozitivna, 25,5% ispitanika je koristilo PrEP i došli su kod lekara zbog simptoma PPI ili izlaganja PPI (12). *Hagazi* i saradnici su objavili da su HIV pozitivne MSM osobe znatno češće praktikovale hemseks u odnosu na HIV negativne osobe (14). Više od polovine naših ispitanika koji su praktikovali hemseks imali su neku bakterijsku PPI u prethodnih godinu dana, a sifilis je bio najčešće registrovan. Rezultati studije koje su sproveli *Glynn* i saradnici (11) su pokazali da je 47% MSM osoba koje su praktikovale hemseks lečeno od neke bakterijske PPI, a gonoreja je bila najčešće dijagnostikovana. Istraživanje iz Norveške (13) je pokazalo da je među osobama koje su praktikovale hemseks najčešće dijagnostikovana hlamidijaza (26,4%).

Upotreba veće količine alkohola među našim ispitanicima koji su praktikovali hemseks mogla se i očekivati s obzirom na to da je konzumiranje alkohola prepoznato kao faktor koji dodatno doprinosi riziku za dobijanje PPI i HIV-a (20,21).

Češća upotreba rekreativnih droga među našim ispitanicima koji nisu praktikovali hemseks mogla bi se objasniti činjenicom da su oni koristili znatno češće kanabis (57,1% ih je koristilo 2 do 3 puta nedeljno, a 87,5% više od 4 puta nedeljno). Kanabis je najčešće korišćena rekreativna droga u Srbiji (8) i druga po učestalosti korišćenja među MSM populacijom (22). *Bruce* i saradnici su opisali da 23% MSM osoba svakodnevno koristi kanabis (20). Nisu postojale razlike među našim ispitanicima prema podatku o poslednjem seksualnom odnosu kada nisu koristili nikakve droge. Većina

most often used among users of services of clinics for venereal diseases, that is, in 57% of patients in Dublin (11), 56% in Brighton (14) and 93% in Amsterdam (12). Data from one study, which was conducted in Australia, showed that only 5.4% of MSM used GHB/GBL (15). Although the use of amphetamine was registered only in 2.3% of our participants, this drug takes second place according to the frequency of use during chemsex – it is used by up to 22% of people (16), and it is most often administered intravenously (17). According to the results of our study, none of the participants used intravenous drugs in the last six months.

GHB/GBL is a newer psychoactive substance in the Republic of Serbia, which is very popular in the population of MSM (9). Although it has some positive effects on sexual behavior (increases sexual pleasure and reduces inhibitions), this drug can cause addiction, while overdose is accompanied by vomiting, problems with breathing, hallucinations, loss of consciousness, and death can occur, as well (18). Therefore, doctors and users of this drug in our environment should be well aware of its side effects.

The use of a larger number of drugs (three or more) during chemsex was registered in 62.6% of our participants and it is a predictor of high-risk sexual behavior and STIs (19). *Sewell et al.* (1) described in their study that 25% of MSM used more drugs. A study, which was conducted in Great Britain among 1,138 MSM, showed that 47% of participants used three and/or more drugs, and even 21% used five and/or more different psychoactive substances (19).

According to the results of our study, the participants, who practiced chemsex in comparison to those who did not practice it, were employed significantly more often, had a greater number of sexual partners during the last six months, practiced group sex and anal sex without condoms, consumed greater amounts of alcohol and had a bacterial STI significantly more often in the last year. Only the frequency of use of recreational drugs was lower in the group of persons who practiced chemsex.

The fact that the users of chemsex were employed significantly more often and had a regular income could explain the greater possibility of acquiring drugs. A high level of employment of MSM who practiced chemsex was also registered in Great Britain – 79.7% (1) and Norway – 83.9% (14).

According to our results, MSM who practiced chemsex were engaged in high-risk sexual behavior and suffered from bacterial STIs more often in the last year, which is in correlation with literature data (1,6,11-13). *Glynn et al* (11) described that 1/3 of MSM who practiced chemsex had more than 10 partners during the previous year and did not use a condom during anal sexual intercourse. According to the data of *Druckler et al*, 42.4% of persons who practiced chemsex in Amsterdam had more than 16 partners during the last six months and 84.3% of them did not use a condom for anal sex (12). A study, which was conducted in Oslo, showed that 60% of MSM who practiced chemsex had more than 11 sexual partners during the last year and 84% of them participated in group sex (13). Our participants who practiced chemsex were more often HIV positive, they used PrEP and they visited our institution due to the symptoms of STIs or exposure to STIs. This is in accordance with the results from Amsterdam where 1/3 of persons who practiced chemsex were HIV positive, 25.5% of participants used PrEP and they visited doctors due to the symptoms of STIs or exposure to STIs (12). *Hagazi* and associates published that HIV positive MSM significantly more often practiced chemsex in comparison to HIV negative persons (14). More than half of our participants who practiced chemsex had some bacterial STI in the previous year, while syphilis was registered most frequently. The results of a study by *Glynn et al.* (11) showed that 47% of MSM who practiced chemsex were treated for some bacterial STI, while gonorrhea was most frequently diagnosed. A study from Norway (13) showed that Chlamydia (26.4%) was most frequently diagnosed among persons who practiced chemsex.

The use of a greater amount of alcohol among our participants who practiced chemsex could be expected because alcohol consumption is recognized as a factor that additionally contributes to the risk of getting STI and HIV (20,21).

The frequent use of recreational drugs among our participants who did not practice chemsex could be explained by the fact that they used cannabis significantly more often (57.1% used them 2 to 3 times a week, and 87.5% more than 4 times a week). Cannabis is the most frequently used recreational drug in Serbia (8) and the second most frequently used in the MSM population (22). *Bruce et al.* described that 23% of MSM used

naših ispitanika (oko 70%) je rekla da su poslednji seks bez upotrebe droga imali tokom prethodnih mesec dana, što je u skladu sa podacima iz Amsterdama gde je ovaj broj iznosio 87% (12).

U našem istraživanju nova bakterijska PPI je registrovana kod 52,8% ispitanika koji su praktikovali hemseks. Čak 27,6% njih je pripadalo osobama sa ponovnim obolevanjem od bakterijske PPI u poslednjih godinu dana, a sifilis je registrovan kod 35% ispitanika. Visoka prevalencija sifilisa je u skladu sa epidemiološkom situacijom u našoj zemlji, gde je ova bolest u kontinuiranom porastu naročito među pripadnicima MSM populacije (23). Ranije sprovedena studija u Beogradu (24) među osobama sa ponovnim obolevanjem od PPI je pokazala da ove osobe praktikuju visoko rizična seksualna ponašanja, češće koriste alkohol i psihoaktivne supstance i imaju specifične dimenzije ličnosti koje prate niska tolerancija frustracija i agresivno ponašanje. Naime, ponašanje osoba koje ponovno obolevaju od PPI je u skladu sa njihovim samokonceptom ličnosti što čini njihov tretman otežanim i ukazuje na značaj primene preventivnih mera za PPI (24).

Glavno ograničenje našeg istraživanja je to što je sprovedeno među pacijentima koji su dolazili u zdravstvenu ustanovu, te je pitanje da li se dobijeni rezultati mogu odnositi i na opštu MSM populaciju u Srbiji.

Zaključak

MSM osobe koje praktikuju hemseks imaju visoko rizično seksualno ponašanje i češće obolevaju od bakterijskih PPI. Sve više prisutan fenomen hemseksa među MSM populacijom ukazuje na značaj podizanja svesti o ovoj pojavi kako među pripadnicima ove vulnerabilne grupe, tako i među zdravstvenim radnicima. Poruke o štetnosti hemseksa trebalo bi da dopru do što većeg broja pripadnika MSM populacije kako preko javnih zdravstvenih servisa, tako i preko društvenih mreža i nevladinih organizacija koje rade sa ovom osetljivom populacijom. MSM osobe bi trebalo da budu upoznate sa činjenicom da je praktikovanje hemseksa povezano sa visoko rizičnim seksualnim ponašanjem i prenošenjem PPI, kao i sa nastankom zavisnosti, predoziranje pa čak i smrtnim ishodom. Zdravstveni radnici koji rade sa MSM populacijom bi trebalo da budu edukovani o dejstvima seksualizovanih droga i da budu obučeni u

pružanju psihološke podrške korisnicima. Savetovanje pacijenata o delovanju ovih droga bi trebalo da se ponudi svim pacijentimakoji dolaze u klinike za polne prenosive bolesti.

Konflikt interesa

Autori su izjavili da nema konflikta interesa.

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cannabis daily (20). There were no differences between our participants regarding data on the last sexual intercourse when they did not use any drugs. The majority of our participants (about 70%) said that they had last sex without the use of drugs during the previous month, which is in accordance with the results from Amsterdam, where this number amounted to 87% (12).

In our study, a new bacterial STI was registered in 52.8% of respondents who practiced chemsex. Even 27.6% of them had repeated STI in the last year, while syphilis was registered in 35% of participants. The high prevalence of syphilis is in accordance with the epidemiological situation in our country, where the number of new cases of this disease continuously rises, especially in the MSM population (23). An earlier study, which was conducted in Belgrade (24) among persons with recurrent STI, showed that these persons practiced high-risk sexual behaviors, used alcohol and psychoactive substances more frequently and had specific personality dimensions accompanied by low tolerance of frustrations and aggressive behavior. Namely, the behavior of persons who repeatedly suffered from STIs was in accordance with their self-concept of personality, which made their treatment more difficult and pointed to the significance of prevention measures for STIs (24).

The main limitation of our study is that it was conducted among patients who came to the health institution, and therefore, the question arises whether the obtained results can be applied to the general MSM population in Serbia.

Conclusion

MSM who practice chemsex are engaged in high-risk sexual behavior and they suffer from bacterial STIs more frequently. The increasingly present phenomenon of chemsex in the MSM population indicates the importance of raising awareness about this phenomenon both among the members of this vulnerable group and among healthcare workers. Messages about the harmfulness of chemsex should reach as many members of the MSM population as possible through public health services, as well as through social media and non-governmental organizations which work with this vulnerable population. MSM should be acquainted with the fact that practicing chemsex is associated with high-risk sexual behavior and transmission of STIs, as well

as addiction, overdose and even death. Healthcare workers who work with the MSM population should be educated about the effects of sexualized drugs and trained to provide psychological support to users. Patient counseling about the effects of these drugs should be offered to all patients who come to clinics for venereal diseases.

Competing interests

The authors declared no competing interests.

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