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POVEZANOST UPOTREBE LEKOVA ZA EREKTILNU DIFUNKCIJU SA SEKSUALNIM PONAŠANJEM I POLNO PRENOSIVIM INFEKCIJAMA KOD MUŠKARACA KOJI IMAJU SEKSUALNE ODNOSE SA MUŠKARCIMA U BEOGRADU

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SAŽETAK

Uvod/Cilj: Lekovi za erektilnu disfunkciju (ED) se sve više koriste u rekreativne svrhe i poboljšanje seksualnih performansi. Oralni inhibitori fosfodiesteraze 5 su najpopularniji tip lekova za ED među muškarcima koji imaju seksualne odnose sa muškarcima (MSM). Cilj ovog istraživanja bio je da se proceni prevalencija upotrebe lekova za ED među MSM populacijom u Beogradu i njena povezanost sa njihovim ponašanjem i polno prenosivim infekcijama.
Metod: Studija preseka je sprovedena u dve zdravstvene ustanove u Beogradu i obuhvatila je 469 MSM osoba. Anonimnim upitnikom prikupljeni su od svih ispitanika podaci o demografskim karakteristikama, seksualnom ponašanju i polno prenosivim infekcijama, upotrebi lekova za ED i drugih rekreativnih droga u prethodnih šest meseci.
Rezultati: Od svih 469 ispitanika 16,2% je koristilo lekove za ED. Prema rezultatima multivarijantne logističke regresione analize ispitanici koji su koristili lekove za ED u odnosu na one koji ih nisu koristili bili su stariji (Unakrsni odnos -UO=2,60, 95% Interval poverenja – 95%IP 2,77–3,84, p<0,001), imali su veći broj seksualnih partnera u poslednjih šest meseci (UO=1,83; 95%IP 1,53–2,18; p<0,001), češće su upotrebljavali marihuanu (UO= 2,55; 95%IP 1,31–4,93; p=0,006) i praktikovali hemseks (seksualni odnos pod uticajem droga koje olakšavaju i poboljšavaju seks) tokom poslednjih šest meseci (UO=3,33; 95%IP 1,69–6,67; p<0,001).
Zaključak: Upotreba lekova za ED među MSM populacijom udružena je sa većim stepenom upotrebe rekreativnih droga i visokorizičnim seksualnim ponašanjem. Neophodne su edukativne poruke o rizicima i posledicama upotrebe lekova za ED.

Ključne reči: lekovi, erektilna disfunkcija, muškarci koji imaju seksualne odnose sa muškarcima, seksualno ponašanje, polno prenosive infekcije

Uvod

Pored upotrebe u lečenju erektilne disfunkcije (ED), lekovi za ED se sve češće koriste i u rekreativne svrhe sa ciljom da poprave seksualnu performansu korisnika kako u populaciji heteroseksualaca (1) tako i među muškarcima koji imaju seksualne odnose sa muškarcima – MSM (2). ED je česta kod MSM osoba inficiranih HIV infekcijom stoga im zdravstveni radnici često propisuju lekove za ED (3). S druge strane, MSM osobe koje ne pate od ED koriste ovu grupu lekova i bez recepta lekara da bi povećali dužinu trajanja i kvalitet erekcije te da bi mogli da imaju seksualne odnose sa većim brojem seksualnih partnera i izbegli eventualne neželjene probleme sa erekcijom (2).

Inhibitori fosfodiesteraze tipa 5 (engl. *Phosphodiesterase 5 inhibitors* – PDE5) za oralnu upotrebu (sildenafil, tadalafil i vardenafil) su najpopularniji lekovi za ED kod pripadnika MSM populacije (4). Oni se često koriste u kombinaciji sa nekim drugim psihoaktivnim supstancama što može biti praćeno

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THE RELATIONSHIP OF ERECTILE DYSFUNCTION DRUGS USE WITH SEXUAL BEHAVIOUR AND SEXUALLY TRANSMITTED INFECTIONS AMONG MEN WHO HAVE SEX WITH MEN IN BELGRADE

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SUMMARY

Background/Aim: Erectile dysfunction (ED) drugs are increasingly being used for recreational purposes and improving sexual performance. Oral phosphodiesterase 5 inhibitors are the most popular type of ED drugs among men who have sex with men (MSM). The aim of this study was to assess the prevalence of ED drugs use among MSM in Belgrade and its association with their behaviour and sexually transmitted infections.
Methods: A cross-sectional study was conducted at two public health care services in Belgrade and it covered 469 MSM. Data on demographic characteristics, sexual history, sexual behaviour, ED drugs and other recreational drugs use in the previous six months were collected from all participants by the use of a questionnaire.
Results: Of all 469 respondents, 16.2% have been using ED drugs. According to the results of multivariate logistic regression analysis, ED drugs users, compared to non-users were older (Odds Ratio – OR=2.60, Confidence interval – 95%CI 2.77-3.84, (p<0,001), had greater number of sexual partners in the last six months (OR= 1.83, 95%CI 1.53-2.18, p<0.001), and more frequently used cannabis (OR=2.55, 95%CI 1.31-4.93, p=0.006) and chemsex in the past six months (OR=3.33, 95%CI 1.69-6.67, p<0.001).
Conclusion: ED drugs use among MSM is associated with higher levels of recreational drugs use and high-risk sexual behaviour. Educational messages about the risks and consequences of using ED drugs are needed.

Key words: drugs, erectile dysfunction, men who have sex with men, sexual behaviour, sexually transmitted infections

Introduction

In addition to being used in the treatment of erectile dysfunction (ED), ED medications are increasingly being used for recreational purposes with the aim of improving the sexual performance of users in the heterosexual population (1), as well as in men who have sex with men – MSM (2). ED is common in MSM who are infected with HIV, and therefore, healthcare professionals often prescribe drugs for ED (3). On the other hand, MSM people who do not suffer from ED use this group of drugs even without doctor's prescription to increase the duration and quality of erections, so that they could have sexual relations with a larger number of sexual partners and avoid possible unwanted problems with erections (2).

Phosphodiesterase 5 inhibitors (PDE5) for oral use (sildenafil, tadalafil and vardenafil) are the most popular drugs for ED in MSM population (4). They are often used in combination with some other psychoactive substances, which can be accompanied by high-risk sexual behavior (promiscuity, sex without condoms, and group sex) and the consequent transmission of sexually transmitted infections – STIs (5-8). The

visoko rizičnim seksualnim ponašanjem (promiskuitet, seks bez kondoma i grupni seks) i posledičnim prenošenjem polno prenosivih infekcija – PPI (5-8). Naročito je opasna istovremena primena ovih lekova sa popersom (amil nitrit) koja dovodi do pada sistemskog arterijskog pritiska i protoka krvi kroz koronarne arterije sa kritičnom stenozom (9). S obzirom na to da nemamo podatke o upotrebi lekova za ED među MSM populacijom u Srbiji, cilj ovog istraživanja je bio da se utvrdi učestalost njene primene i udruženost sa seksualnim ponašanjem i obolevanjem od PPI među MSM populacijom u Beogradu.

Metode

U okviru ovog istraživanja je sprovedena studija preseka u periodu od 1. avgusta 2022. godine do 31. januara 2023. godine među pripadnicima MSM populacije koji su došli na pregled ili u savetovalište za polne bolesti Gradskog zavoda za kožne i venerične bolesti u Beogradu i na regularnu kontrolu u ambulantu za HIV infekciju na Infektivnoj klinici Kliničkog centra Srbije. Svi ispitanici su popunjavali anonimni upitnik koji je sadržao pitanja o osnovnim demografskim karakteristikama (uzrast, obrazovanje i zaposlenost), razlogu dolaska kod lekara, HIV-statusu, upotrebi pre-ekspozicione profilakse za HIV (engl. *Pre-exposure prophylaxis* - PrEP), lečenoj bakterijskoj polnoj infekciji (rani sifilis, gonoreja i hlamidijaza) u poslednjih godinu dana, kao i o broju seksualnih partnera, upotrebi kondoma tokom analnog seksa, grupnom seksu i upotrebi rekreativnih droga tokom seksa u poslednjih šest meseci (popers i marihuana). Takođe su odgovarali na pitanja o konzumiranju alkohola u poslednjih godinu dana, kao i o upotrebi intravenskih droga u poslednjih 6 meseci. Trebalo je da svi ispitanici zaokruže na ponuđenoj listi koje ilegalne droge [seksualizovane droge – hemseks (engl. *chemsex*) koje se uzimaju pre ili tokom seksualnog odnosa da bi olakšale i poboljšale seks: gama-hidroksibutirat (GHB)/gama-butirolakton (GBL), ekstazi, amfetamin, kristalni metamfetamin, kokain, ketamin i mefedron, ili ostale rekreativne droge: marihuanu, popers i lekove za ED] su koristili u poslednjih 6 meseci. Prema skraćenoj verziji upitnika Svetske Zdravstvene Organizacije – AUDIT (engl. *Alcohol Use Disorders Identification Test*, test za identifikaciju poremećaja upotrebe alkohola) o konzumiranju alkohola u poslednjih godinu dana (10) prema frekvenciji pijenja i količini unetog alkohola ispitanici su podeljeni u tri grupe (manje rizično pijenje, riskantno pijenje i visoko rizično pijenje). Prema vrednostima skora iz odgovora na prva dva pitanja iz AUDIT testa, manje rizično pijenje definisano je skorom ≤1, riskantno pijenje skorom >1 na drugo pitanje iz testa, a visoko rizično pijenje skorom ≥6 (10).

Svim pacijentima koji su imali simptome i/ili znake PPI, ili podatak o izloženosti PPI rađeni su testovi na bakterijske polne bolesti. Za dijagnozu gonoreje rađen je direktni mikroskopski preparat brisa uretre sa identifikacijom karakterističnih intracelularnih diplokoka u leukocitima, a dijagnoza hlamidijaze potvrđena je pozitivnim *Chlamydia trachomatis* PCR (engl. *Polymerase chain reaction*, polimeraza lančana reakcija) testom iz brisa uretre. Dijagnoza ranog sifilisa (primarni, sekundarni i rani latentni stadijum sifilisa) je potvrđena pozitivnim serološkim testovima na sifilis (engl. *Venereal Disease Research Laboratory* – VDRL, laboratorijski test za istraživanje veneričnih bolesti i engl. *Treponema Pallidum Haemagglutination Assay* – TPHA, *Treponema Pallidum* hemaglutinacioni test). Ispitanici koji nisu imali simptome PPI nisu bili testirani na polne bolesti. Etički odbor Gradskog zavoda za kožne i venerične bolesti u Beogradu dao je dozvolu za ovo istraživanje (br. 1861/3).

Varijable su predstavljene brojevima i procentima. U statističkoj analizi razlika između upoređivanih grupa korišćene su univarijantna i multivarijantna logistička regresiona analiza. U multivarijantnu analizu uključene su sve varijable koje su prema rezultatima univarijantne analize, bile povezane sa upotrebom lekova za ED na nivou statističke značajnosti $p \leq 0,1$. Varijable koje su bile ograničene samo na deo ispitivane populacije, kao što su PrEP i broj korišćenih rekreativnih droga, dodavane su jedna po jedna u nove modele multivarijantne analize. Metod selekcije je bio unazadni (engl. *backward*) Wald test. Sve p vrednosti su bile bazirane na dvosmernom (engl. *two-tailed*) testu, a vrednosi $p < 0,05$ su smatrane statistički značajnim. Za analizu baze podataka je korišćen softverski paket programa *IBM SPSS Statistics for Windows*, version 23 (*Armonk, NY, IBM Corp.*).

Rezultati

U studiju je uključeno 469 MSM osoba od kojih je 76 (16,2%) koristilo lekove za ED. U poređenju

simultaneous use of these drugs with poppers (amyl nitrite) is particularly dangerous because it leads to a decrease in systemic arterial pressure and blood flow through coronary arteries with critical stenosis (9). Given that we do not have data on the use of ED drugs among the MSM population in Serbia, the aim of this study was to determine the frequency of its use and the connection with sexual behavior and sexually transmitted infections (STIs) among the MSM population in Belgrade.

Methods

Within this research, a cross-sectional study was conducted from August 1st, 2022 to January 31st, 2023 in the population of MSM 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 to the regular check-up at the Clinic for HIV infection of the Clinical Center of Serbia. All respondents filled out the anonymous questionnaire, which contained questions about basic demographic characteristics (age, education and employment), reasons for visiting the doctor, HIV status, use of pre-exposure prophylaxis for HIV (PrEP), treated bacterial sexual infections (early syphilis, gonorrhea and Chlamydia) during the last year, as well as the number of sexual partners, use of condoms during anal sex, group sex and use of recreational drugs during sex in the last six months (poppers and marijuana). Also, they answered questions about alcohol consumption in the past year and about the intravenous drug use in the past 6 months. All respondents had to circle on the offered list which illegal drugs [sexualized drugs – chemsex that are taken before or during sexual intercourse to facilitate and improve sex: gamma-hydroxybutyrate (GHB)/gama-butyrolactone (GBL), ecstasy, amphetamine, crystal methamphetamine, cocaine, ketamine and mephedrone, or other recreational drugs: marijuana, poppers and ED drugs], they have used during the past 6 months. According to the abbreviated version of the questionnaire of the World Health Organization – AUDIT test (Alcohol Use Disorders Identification Test) about alcohol consumption in the last year (10) related to the frequency of drinking and the amount of alcohol consumed, the participants were divided into three groups (low-risk drinking, risky drinking and high-risk drinking). According to the scores from the first two questions from the AUDIT test, low risk drinking was defined by the score <1, risky drinking by the score >1for the second test question and high-risk drinking by the score >6 (10).

All patients who had symptoms and/or signs of STIs, or the information about the exposure to STIs, were tested for bacterial venereal diseases. For the diagnosis of gonorrhea, a direct microscopic preparation of the urethral swab was made with the identification of characteristic intracellular diplococci in leukocytes, while the diagnosis of Chlamydia was confirmed by positive Chlamydia trachomatis PCR test from the urethral swab. The diagnosis of early syphilis (primary, secondary and early latent stage of syphilis) was confirmed by positive serological tests for syphilis (Venereal Disease Research Laboratory – VDRL and Treponema Pallidum Haemagglutination Assay – TPHA). The participants who had no symptoms of STIs were not tested for sexually transmitted diseases. The Ethics Committee of the City Institute for Skin and Venereal Diseases in Belgrade gave permission for this research (No. 1861/3).

Variables are represented by numbers and percentages. Univariate and multivariate logistic regression analysis were used in the statistical analysis of differences between the compared groups. All variables, which were connected with the use of ED drugs at the level of statistical significance $p < 0.1$ according to the results of univariate analysis, were included in multivariate analysis. The variables, which were limited to one part of the examined population, such as PrEP and the number of used recreational drugs, 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 $p<0.05$ were considered to be statistically significant. The software package IBM SPSS for Windows, version 23 (Armonk, NY, IBM Corp.) was used for the analysis of database.

Results

The study included 469 MSM, of whom 76 (16.2%) used ED medications. In comparison to the participants who did not use ED drugs (393 persons, 83.8%), the users of ED drugs were older ($p<0.001$), they used PrEP more often ($p<0.001$), had more sexual partners ($p<0.001$), anal sex without condom use ($p=0.07$) and practiced

sa ispitanicima koji nisu koristili lekove za ED (393 osobe, 83,8%), korisnici lekova za ED su bili stariji (p<0,001), češće su koristili PrEP (p<0,001), imali su veći broj seksualnih partnera (p<0,001), analni seks bez upotrebe kondoma (p=0,07) i praktikovali su grupni seks (p<0,001) u toku poslednjih šest meseci (Tabela 1). Ispitanici koji su koristili lekove za ED su češće imali neku od bakterijskih PPI u poslednjih godinu dana (p=0,004), dijagnostikovana im je nova bakterijska PPI (p=0,009) i češće su imali ponovne bakterijske PPI (p<0,001). U odnosu na novopostavljenu dijagnozu bakterijske polne infekcije među svim ispitanicima sifilis je bio najčešći i registrovan je kod 122 osobe (26%), zatim gonoreja kod 41 ispitanika (8,9%) i hlamidijaza kod 16 ispitanika (3,5%). Između ispitivanih grupa nisu postojale značajne razlike prema obrazovanju, zaposlenosti, razlogu dolaska lekaru i prema HIV pozitivnom statusu.

Prema rezultatima prikazanim u Tabeli 2, MSM osobe koje su koristile lekove za ED u odnosu na ispitanike koji ih nisu koristili, češće su upotrebljavale marihuanu (p<0,001), popers (p<0,001) i hemseks (p<0,001) tokom poslednjih šest meseci, a i koristile su veći broj različitih rekreativnih droga (p<0,001). Između ispitanika nisu postojale značajne razlike prema upotrebi alkohola, učestalosti konzumiranja rekreativnih droga i vremena u kom su imali poslednji seksualni odnos bez upotreba droga (engl. *sober sex*).

Rezultati multivarijantne analize su predstavljeni u Tabeli 3. U odnosu na osobe koje nisu koris-

Tabela 1. Ukupan broj novoobolelih od sifilisa i prosečna incidencija (na 100.000), po polu i uzrastu, i odnos polova, Beograd, 2011-2020. godine

Varijable	Ispitanici koji koriste lekove za ED (n=76) Broj (%)	Ispitanici koji ne koriste lekove za ED (n=393) Broj (%)	p vrednost*
Uzrast (godine)			
≤ 25	2 (2,6)	72 (18,3)	<0,001
26-35	17 (22,4)	152 (38,7)	
36-45	43 (56,6)	118 (30,0)	
45+	14 (18,4)	51 (13,0)	
Dužina trajanja obrazovanja (godine)			
≤ 12	33 (43,4)	201(51,1)	0,219
>12	43 (56,6)	192 (48,9)	
Zaposlenost	61 (80,3)	313 (74,6)	0,902
Razlog posete lekaru			
Simptomi PPI	25 (32,9)	104 (26,5)	0,134
Izloženost PPI	17 (22,4)	63 (16,0)	
Simptomi nevezani sa PPI	34 (44,8)	226 (57,5)	
HIV pozitivan status	35 (46,1)	159 (40,5)	0,365
Upotreba PrEP-a	9 (22,0)	11 (4,7)	<0,001
Broj seksualnih partnera u poslednjih šest meseci:			
1-3	7 (9,2)	210 (53,4)	<0,001
4-9	21 (27,6)	119 (30,3)	
10+	48 (63,2)	64 (16,3)	
Analni seks bez upotrebe kondoma u poslednjih šest meseci	60 (78,9)	262 (66,7)	0,037
Grupni seks u poslednjih šest meseci	46 (60,5)	76 (19,3)	<0,001
Bakterijske PPI u poslednjih godinu dana	36 (47,4)	119 (30,3)	0,004
Novodijagnostikovana bakterijska PPI	39 (51,3)	139 (35,4)	0,009
Ponovno obolevanje od bakterijske PPI	19 (25,0)	40 (10,2)	<0,001

* Prema rezultatima univarijantne logističke regresione analize; PPI – polno prenosive infekcije; HIV – virus humane imunodeficijencije; PrEP – Pre-ekspoziciona profilaksa za HIV.

group sex (p<0.001) in the last six months (Table 1). The participants, who used ED medications, had more often a bacterial STI in the past year (p=0.004), were diagnosed with a new bacterial STI (p=0.009), and had a recurrent bacterial STI more often (p<0.001). In relation to the newly diagnosed bacterial sexual infection among all participants, syphilis was the most common and was registered in 122 persons (26%), followed by gonorrhea in 41 participants (8.9%) and Chlamydia in 16 participants (3.5%). There was no significant difference between the examined groups regarding education, employment, reason for visiting the doctor and HIV positive status.

According to the results shown in Table 2, MSM who used ED drugs in comparison to non-users, used marijuana more frequently in the past six months (p<0.001), as well as poppers (p<0.001), chemsex (p<0.001), and different recreational drugs (p<0.001). There were no significant differences between the participants in relation to alcohol consumption, frequency of recreational drugs use and the time when they had the last sexual intercourse without the use of drugs (sober sex).

The results of multivariate analysis are presented in Table 3. Compared to people who did not use ED drugs, the participants who used them were significantly more often older (Odds Ratio – OR=2.60, Confidence interval – 95%CI 2.77-3.84, p<0.001) had a larger number of sexual partners in the last six months (OR=1.83; 95%CI 1.53-2.18; p<0.001), used marijuana more

Table 1. Distribution of participants who used drugs for erectile dysfunction (ED) and those who did not in relation to demographic characteristics, sexual behavior and sexually transmitted infections (STIs)

Variables	Participants who use ED drugs (n=76) Number (%)	Participants who do not use ED drugs (n=393) Number (%)	p value*
Age (years)			
≤ 25	2 (2.6)	72 (18.3)	<0.001
26-35	17 (22.4)	152 (38.7)	
36-45	43 (56.6)	118 (30.0)	
45+	14 (18.4)	51 (13.0)	
Duration of education (years)			
≤ 12	33 (43.4)	201(51.1)	0.219
>12	43 (56.6)	192 (48.9)	
Employment	61 (80.3)	313 (74.6)	0.902
Reason for visiting the doctor			
Symptoms of STI	25 (32.9)	104 (26.5)	0.134
Exposure to STI	17 (22.4)	63 (16.0)	
Symptoms not related to STI	34 (44.8)	226 (57.5)	
HIV positive status	35 (46.1)	159 (40.5)	0.365
Use of PrEP-a	9 (22.0)	11 (4.7)	<0.001
Number of sexual partners in the last six months			
1-3	7 (9.2)	210 (53.4)	<0.001
4-9	21 (27.6)	119 (30.3)	
10+	48 (63.2)	64 (16.3)	
Anal sex without the use of condoms in the last six months	60 (78.9)	262 (66.7)	0.037
Group sex in the last six months	46 (60.5)	76 (19.3)	<0.001
Bacterial STI in the last year	36 (47.4)	119 (30.3)	0.004
Newly diagnosed bacterial STI	39 (51.3)	139 (35.4)	0.009
Recurrent bacterial STI	19 (25.0)	40 (10.2)	<0.001

* according to the results of univariate logistic regression analysis; STI – sexually transmitted infection; HIV – human immunodeficiency virus; PrEP – Pre-exposure prophylaxis for HIV.

Tabela 2. Distribucija ispitanika koji su koristili lekove za erektilnu disfunkciju (ED) i onih koji nisu u odnosu na upotrebu alkohola i drugih rekreativnih droga

Varijable	Ispitanici koji koriste lekove za ED (n=76) Broj (%)	Ispitanici koji ne koriste lekove za ED (n=393) Broj (%)	p vrednost*
Konzumiranje alkohola u poslednjih godinu dana:**			
Manje rizično pijenje	53 (69,7)	292 (74,3)	0,215
Riskantno pijenje	20 (26,3)	97 (24,7)	
Visoko rizično pijenje	3 (3,9)	4 (1,0)	
Upotreba marihuane u poslednjih šest meseci	35 (46,1)	64 (16,3)	<0,001
Upotreba popersa u poslednjih šest meseci	38 (50,0)	90 (22,9)	<0,001
Upotreba hemseksa u poslednjih šest meseci	45 (59,2)	78 (19,8)	<0,001
Učestalost upotrebe rekreativnih droga:			
Jednom mesečno	40 (52,6)	89 (58,6)	0,822
2-4 puta mesečno	26 (34,2)	37 (24,3)	
2-3 puta nedeljno	7 (9,2)	21 (13,8)	
≥ 4 puta nedeljno	3 (3,9)	5 (3,3)	
Broj rekreativnih droga korišćenih u poslednjih šest meseci:			
1	16 (21,1)	83 (54,6)	<0,001
2	14 (18,4)	35 (23,0)	
3-8	46 (60,5)	34 (22,4)	
Poslednji seksualni odnos bez upotrebe droga (engl. sober sex):			
Prošlog meseca	58 (76,3)	105 (69,1)	0,597
Pre više od 3 meseca	5 (6,6)	31 (20,4)	
Pre više od 6 meseci	4 (5,3)	9 (5,9)	
Pre više od godinu dana	9 (11,8)	7 (4,6)	

* 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, riskantno pijenje: skor >1 prema drugom pitanju iz upitnika i visoko rizično pijenje: skor ≥6 (10).

Tabela 3. Rezultati multivarijantne logističke regresione analize

	Ispitanici koji su koristili lekove za ED vs. ispitanici koji nisu koristili lekove za ED		
Varijable	**Unakrsni odnos**	**95% interval poverenja**	**p vrednost***
Uzrast	2,6	1,7-3,8	<0,001
Broj seksualnih partnera u poslednjih šest meseci	1,8	1,5-2,2	<0,001
Upotreba marihuane u poslednjih šest meseci	2,6	1,3-4,9	0,006
Hemseks u poslednjih šest meseci	3,3	1,7-6,7	<0,001

ED – erektilna disfunkcija; *p vrednost prema rezultatima multivarijantne analize.

Table 2. Distribution of participants who used drugs for erectile dysfunction (ED) and those who did not in relation to alcohol consumption and use of other recreational drugs

Variables	Participants who use drugs for ED (n=76) Number (%)	Participants who do not use drugs for ED (n=393) Number (%)	p value*
Alcohol consumption in the last year:**			
Low-risk drinking	53 (69.7)	292 (74.3)	0.215
Risky drinking	20 (26.3)	97 (24.7)	
High-risk drinking	3 (3.9)	4 (1.0)	
Use of marijuana in the last six months	35 (46.1)	64 (16.3)	<0.001
Use of poppers in the last six months	38 (50.0)	90 (22.9)	<0.001
Use of chemsex in the last six months	45 (59.2)	78 (19.8)	<0.001
Frequency of recreational drugs use:			
Once in a month	40 (52.6)	89 (58.6)	0.822
2-4 times a month	26 (34.2)	37 (24.3)	
2-3 times a week	7 (9.2)	21 (13.8)	
≥ 4 times a week	3 (3.9)	5 (3.3)	
Number of recreational drugs used in the last six months:			
1	16 (21.1)	83 (54.6)	<0.001
2	14 (18.4)	35 (23.0)	
3-8	46 (60.5)	34 (22.4)	
The last sexual intercourse with no drugs used (sober sex):			
Last month	58 (76.3)	105 (69.1)	0.597
More than 3 months ago	5 (6.6)	31 (20.4)	
More than 6 months ago	4 (5.3)	9 (5.9)	
A year ago	9 (11.8)	7 (4.6)	

*according to the results of univariate logistic regression analysis; **Alcohol consumption was based on responses to the first two questions from the shortened version of the Alcohol Use Disorders Identification Test of the World Health Organization; Low-risk drinking: score ≤1, risky drinking: score >1 according to the second question from the AUDIT test and high risk drinking: score ≥6 (10).

Table 3. Results of multivariate logistic regression analysis

	Participants who used ED drugs vs. participants who did not use ED drugs		
Variable	**Odds Ratio**	**95% Confidence Interval**	**p value***
Age	2.6	1.7-3.8	<0.001
Number of sexual partners in the last six months	1.8	1.5-2.2	<0.001
Use of marijuana in the last six months	2.6	1.3-4.9	0.006
Chemsex in the last six months	3.3	1.7-6.7	<0.001

ED –erectile dysfunction; *p-value according to the results of multivariate analysis.

tile lekove za ED, ispitanici koji su ih koristili bili su značajno češće stariji (Unakrsni odnos – UO=2,60, Interval poverenja– 95%IP 2,77-3,84, (p<0,001), imali su veći broj seksualnih partnera u poslednjih šest meseci (UO=1,83; 95%IP 1,53–2,18; (p<0,001), češće su upotrebljavali marihuanu (UO=2,55; 95%IP 1,31–4,93; p=0,006) i praktikovali hemseks tokom poslednjih šest meseci (UO=3,33; 95%IP 1,69-6,67; p<0,001).

Diskusija

Prema našim rezultatima 16,2% MSM osoba je koristilo lekove za ED tokom prethodnih šest meseci. Ovo je u skladu sa većinom studija koje su opisale da se procenat korisnika lekova za ED u MSM populaciji kretao od 12% (11) do 21% (4,12), mada su neka istraživanja sprovedena u Sjedinjenim Američkim Državama registrovala i veći procenat korisnika – oko 30% (13,14). Prema rezultatima multivarijantne regresione analize ispitanici koji su koristili lekove za ED u odnosu na one koji ih nisu koristili, bili su starijeg uzrasta, imali su veći broj seksualnih partnera u poslednjih šest meseci, češće su koristili marihuanu i praktikovali hemseks.

Većina naših ispitanika koji su koristili lekove za ED (75%) su bili stariji od 36 godina, što je u skladu sa rezultatima ostalih istraživanja. U studiji sprovedenoj u San Francisku 63% ispitanika koji su koristili Viagru (sildenafil) bilo je starije od 35 godina (12), dok je prosečna starost MSM osoba koje su koristile Viagru u Australiji bila 36,1 (11), a u studiji sprovedenoj u Sjedinjenim Američkim Državama 44,6 godina (2). Ovo bi se moglo objasniti činjenicom da su starije osobe već ranije u životu imale iskustvo sa ED usled medicinskih stanja povezanih sa starenjem, kao i time da stariji muškarci češće koriste lekove za ED kako bi održali erekciju i produžili trajanje seksualnog odnosa s obzirom na to da tokom analnog seksa uglavnom imaju insertivnu ulogu (11). Osobe koje žive sa HIV-om znatno češće imaju ED te ne čudi to što češće koriste ovu grupu lekova u odnosu na HIV-negativne osobe (12), ali to nismo primetili u našem istraživanju.

Skoro ⅔ naših ispitanika koji su koristili lekove za ED imalo je više od 10 seksualnih partnera u toku prethodnih šest meseci i češće je koristilo rekreativne droge u odnosu na ispitanike koji nisu koristili lekove za ED. Oni su češće imali visokorizično seksualno ponašanje (analni seks bez kondoma i grupni seks), bakterijske PPI u prethodnih godinu dana, dijagnostikovanu novu bakterijsku PPI i češće su obolevali od ponovnih bakterijskih PPI. Sifilis je bila infekcija koja se najčešće registrovala među našim ispitanicima što je u skladu sa aktuelnom epidemiološkom situacijom polnih bolesti u Srbiji (15). *Paul* i saradnici (14) su u svom istraživanju opisali da su korisnici Viagre imali veći broj seksualnih partnera, praktikovali su insertivni analni seks bez kondoma i imali neku bakterijsku PPI u prethodnih godinu dana. Istraživanje *Kim* i saradnika (13) je takođe opisalo da su korisnici Viagre u odnosu na one koji je nisu koristili, znatno češće imali seks sa većim brojem partnera i podatak o bakterijskoj PPI u poslednjih godinu dana. Studija sprovedena u Australiji je pokazala da su MSM osobe koje koriste lekove za ED znatno češće praktikovale grupni seks (16). Lekovi za ED imaju pozitivan efekat na seksualnu aktivnost sa većim brojem partnera i na produžetak trajanja seksualnog odnosa što povećava rizik za prenošenje kako HIV-a tako i ostalih PPI.

Kao što smo već napomenuli, prema rezultatima našeg istraživanja korisnici lekova za ED su znatno češće koristili marihuanu, popers i ostale seksualizovane droge. Hemseks droge se koriste pre ili tokom seksualnog odnosa da bi olakšale stupanje u seksualne odnose i poboljšale seksualno zadovoljstvo i ovaj fenomen je predominantno opisan među MSM populacijom (17). Hemseks je pozitivno povezan sa visoko rizičnim seksualnim ponašanjem i prenošenjem HIV-a i PPI (18). *Chu* i saradnici (20) su objavili da je 36% MSM kombinovalo Viagru sa ostalim ilegalnim rekreativnim drogama, a veliki broj studija je potvrdio pozitivnu vezu između upotrebe lekova za ED i ostalih rekreativnih droga (1,14,19). Prema podacima Kim i saradnika (13) Viagra se najčešće kombinovala sa ekstazijem, metamfetaminom i popersom i 73% korisnika je verovalo da im istovremena upotreba ovih droga poboljšava seksualno iskustvo. *Crosby* i saradnici (20) su opisali često kombinovanje lekova za ED sa ekstazijem i kokainom. Iako je istovremena upotreba lekova za ED i popersa (opisana i kod naših ispitanika) kontraindikovana, to ne sprečava korisnike da ih zajedno konzumiraju. Česta upotreba marihuane među našim ispitanicima koji su koristili lekove za ED ne čudi jer je marihuana i inače najčešće korišćena ilegalna droga u Srbiji (21).

Naša studija ima nekoliko ograničenja. Glavno je to što je sprovedena među MSM osobama koje su dolazile u zdravstvene ustanove i upitno je da li se dobijeni rezultati mogu generalizovati na čitavu

frequently (OR=2.55; 95%CI 1.31-4.93; p=0.006) and practiced chemsex during the last six months (OR=3.33; 95%CI 1.69-6.67; p<0.001).

Discussion

According to our results, 16.2% of MSM used ED drugs in the past six months. This is consistent with the results of most studies, which reported that the percentage of ED drug users in the MSM population ranged between 12% to 21% (4,12), although some studies that were conducted in the United States of America registered a higher percentage of users – about 30% (13,14). According to the results of multivariate regression analysis, the participants, who used ED drugs in comparison to those who did not, were older, had a greater number of sexual partners in the last six months, used marijuana more often and practiced chemsex.

The majority of our participants, who used ED drugs (75%), were older than 36, which is consistent with the results of other studies. In the study, which was conducted in San Francisco, 63% of participants who used Viagra (sildenafil) were older than 35 (12), while the average age of men who had sex with men and who used Viagra was 36.1 in Australia (11), and 44.6 years in one study conducted in the United States of America (2). This could be explained by the fact that older people had experienced ED previously due to medical conditions related to aging, as well as by the fact that older men use medications for ED more often in order to maintain the erection and prolong the sexual intercourse given that they have an insertive role during anal sex (11). People living with HIV have ED significantly more often, and therefore, they use this group of drugs more often than HIV-negative people (12), but we did not notice that in our research.

Almost ⅔ of our participants who used ED drugs had more than 10 sexual partners in the previous six months and they used recreational drugs more often in comparison to other participants who did not use ED drugs. High risk sexual behavior (anal sex without condoms and group sex) was more often present in these participants, as well as bacterial STIs in the previous year, new bacterial STI and recurrent bacterial STIs. Syphilis was the most frequently registered infection among our respondents, which is in line with the current epidemiological situation in Serbia regarding sexually transmitted diseases (13). Paul and associates (14) described in their study that Viagra users had a greater number of sexual partners, practiced insertive anal sex without condoms and had some bacterial STI in the previous year. In the study of Kim and associates (13), it was also described that Viagra users, compared to those who did not use Viagra, significantly more often had sex with a greater number of partners and reported bacterial STI in the past year. A study conducted in Australia showed that MSM who used ED medications practiced group sex more often (16). ED medications have a positive effect on sexual activity with more partners and on the prolongation of sexual intercourse, which increases the risk of transmitting both HIV and other STIs.

As we have already mentioned, according to the results of our research, the users of ED drugs used marijuana, poppers and other sexualized drugs significantly more often. Chemsex drugs are used before or during sexual intercourse in order to facilitate the intercourse and enhance sexual satisfaction, and this phenomenon has been predominantly described among the MSM population (17). Chemsex is positively associated with high-risk sexual behavior and transmission of HIV and other STIs (18). Chu and associates (20) reported that 36% of MSM combined Viagra with other illegal recreational drugs, while a large number of studies confirmed the positive association between ED drugs use and other recreational drugs (1,14,19). According to Kim and associates (13), Viagra was most often combined with ecstasy, methamphetamine, and poppers, and 73% of users believed that the simultaneous use of these drugs improved their sexual experience. Crosby and associates (20) described the frequent combination of ED drugs with ecstasy and cocaine. Although the simultaneous use of ED drugs and poppers (also described in our participants) is contraindicated, this does not prevent users from using them together. The frequent use of marijuana among our participants who used drugs for ED is not surprising because marijuana is the most commonly used illegal drug in Serbia (21).

Our study has several limitations. The main reason is that it was conducted among MSM persons who came to healthcare institutions, and it is questionable whether the obtained results can be generalized to the entire MSM population. Also, we did not collect data from the participants

MSM populaciju u Srbiji. Takođe nismo uzimali podatke od ispitanika koliko su često koristili lekove za ED i kako su dolazili do njih, da li preko lekarskog recepta ili bez njega i da li su lek koristili u terapijske ili rekreativne svrhe. Takođe, nismo se bavili ispitivanjem da li osobe koje koriste lekove za ED, zaista i imaju ED.

Zaključak

Upotreba lekova za ED kod MSM osoba udružena je sa većim stepenom primene rekreativnih droga i visokorizičnim seksualnim ponašanjem. Dermatovenerolozi, posebno oni koji rade sa MSM populacijom, bi trebalo da sa pacijentima diskutuju, ne samo o potencijalnim štetnim dejstvima lekova za ED, već i o riziku kombinovanja ovih lekova sa drugim rekreativnim drogama i rizicima za PPI i HIV koji postoje kod korisnika lekova za ED.

Konflikt interesa

Autori su izjavili da nema konflikta interesa.

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about how often they used ED drugs and how they obtained them, whether they had a prescription or not and whether they used the drug for therapeutic or recreational purposes. Also, we did not examine whether people, who used ED drugs, really had ED.

Conclusion

ED drug use among MSM is associated with a higher level of recreational drug use and high-risk sexual behavior. Dermatovenerologists, especially those working with the MSM population, should discuss with their patients not only the potential adverse effects of ED medications, but also the risk of combining these medications with other recreational drugs and the risk of HIV and STIs in ED drug users.

Competing interests

The authors declared no competing interests.

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