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## Sexualized Drug Use and Chemsex: Their Association with Sexual Health Among Men who have Sex with Men Living in Greece

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### ABSTRACT

**Objectives:** The study aims to investigate rates of sexualized drug use (SDU) and chemsex, a type of SDU involving specifically the use of crystal methamphetamine, mephedrone, or GHB/GBL and their association with the rates of negative sexual health outcomes among men who have sex with men (MSM) in Greece. **Methods:** Survey of 485 MSM in internal disease departments and community testing centers. **Results:** Twenty-eight percent of participants were involved in SDU and 20.4% in chemsex. HIV positive status and recent STI diagnoses were associated with SDU involvement. **Conclusion:** SDU and chemsex rates and their impact on health reveal the need for informed community-based services.

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### Introduction

Sexualized drug use (SDU), the use of any legal or illicit substance, like alcohol, cocaine, crack, ketamine, cannabis, poppers (alkyl esters of nitrous acid) or others, before or during sex (Hibbert et al., 2019), is considered a risk factor for sexual health, especially for the men who have sex with men (MSM) population (Desai et al., 2018). Over the past decade, a specific type of SDU, called *chemsex*, has received greater attention. Chemsex is defined as the consensual use of crystal methamphetamine, mephedrone, and GHB/GBL before or during sexual activities among MSM (Bourne et al., 2015). Chemsex, or *Party and Play*, as it is also referred to, is used to facilitate, enhance, and prolong sexual activity, as well as to explore gender and sexual identity, connection and sexual practices, in a context experienced as safe and nonstigmatizing, released from the stereotypical heteronormative masculinity and femininity in sexual roles (Amaro, 2016;

Bourne et al., 2018; Evans, 2019; Javid, 2017; Poulios, 2020a; Stuart & Weymann, 2015). The aforementioned substances are commonly used combined and mixed with other substances, such as cocaine, cannabis, poppers (alkyl esters of nitrous acid), ketamine, as well as antidepressants, anxiolytics, and erectile dysfunction drugs (Edmundson et al., 2018; Giorgetti et al., 2017; Maxwell et al., 2019). It is worth mentioning that there is no consensus among researchers whether SDU and chemsex are different entities (Edmundson et al., 2018). SDU and chemsex are commonly studied supplementing one another, or even intertwined in some cases (Evers et al., 2020). According to Edmundson et al. (2018), very few studies have been conducted addressing the factors associated particularly with chemsex and its impact.

Chemsex has drawn the attention of healthcare professionals for the part it plays as a risk factor for HIV transmission and other sexually transmitted infections (STI), due to its tendency for

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higher-risk sex involvement, as well as for poor psychosocial health (Bourne et al., 2018; Maxwell et al., 2019). Despite the fact that the particular risk of HIV transmission seems to be reduced in countries where pre-exposure prophylaxis (PrEP) is distributed (Maxwell et al., 2019; Maxwell et al., 2020), chemsex also entails numerous other biopsychosocial risks such as dependence, abuse, dehydration, heart failure, less safe sexual practices, nonconsensual acts, depression, anxiety, psychosis, job loss and difficulty enjoying sober sexual life, meaning engaging in sexual activities without the use of substances (Bourne et al., 2018; Daskalopoulou et al., 2014; Giorgetti et al., 2017; Glynn et al., 2018; Hegazi et al., 2017; Pufall et al., 2018). In addition, MSM already living with HIV may well be more often involved in SDU and chemsex than those who are seronegative, or undiagnosed (Frankis et al., 2018; Pufall et al., 2018) and prefer to engage in SDU with other seropositive MSM (Bowman et al., 2021). More specifically, living with HIV complicates the individual's sex life and involvement in SDU (Platteau et al., 2015) and chemsex could assist in the activation of their sexual life. The higher frequency of SDU and chemsex among seropositive MSM could be attributed to the fact that these practices possibly serve as means to cope with living with HIV and the social stigma it induces (Poulios, 2020a, 2020b; Power et al., 2018; Rueda et al., 2016; Smith & Tasker, 2018).

Concerning demographic factors, chemsex appears to be rare in sexual encounters among exclusively heterosexual men (Maxwell et al., 2019; Ottaway et al., 2017). Regarding age, at least in Europe, it is more common after the age of thirty (Barrett et al., 2019; Bohn et al., 2020; Evers et al., 2020; Sewell et al., 2019). Social, cultural and political factors seem to moderate the chemsex rates, its consequences, the preference of one of the three substances over others and its relationship with HIV (Maxwell et al., 2019; Stuart, 2019). In Europe, chemsex rates among MSM are estimated to be between 13% and 27% (Glynn et al., 2018; Hammoud et al., 2018; Hampel et al., 2020; Hegazi et al., 2017). However, in Eastern Europe and the Balkan area, where Greece is located, chemsex seems to be less common among MSM on a national level

with rates ranging from 0% to 14% (Guerras et al., 2021; Maxwell et al., 2019; Schmidt et al., 2016).

To our knowledge, this is the first study to be conducted on the Greek population focusing on SDU, and chemsex, in particular, among MSM. Therefore, our main aim was to investigate the rates in the Greek MSM population and compare them with those of neighboring areas. Moreover, we investigated how demographic and sexual health factors, such as area of residence, age, recent STIs diagnosis excluding HIV (in the past 6 mo) are differentiated between those involved in SDU and chemsex and those not engaging, to signify the target population for future interventions, taking into consideration sexual health and rights, while also promoting sexual pleasure and well-being, according to contemporary guidelines for healthcare professionals (Ford et al., 2019, 2021). Investigating the association of sexual health in particular with SDU and chemsex in Greece is also important, as PrEP is not distributed by the public health system and its rates are very low, not exceeding 2.6% of the MSM population (Bowman et al., 2021), which increases the possibility for HIV transmission. We further investigated whether the frequency of drug use, percentage of sober sexual life, STI (excluding HIV) diagnosis in the past 6 mo, self-perceived negative impact of SDU on one's life, condom use, sexual disinhibition, and sober sex enjoyment were significantly differentiated between seronegative and seropositive MSM, involved with SDU.

## Methods

### *Participants and recruitment*

The total number of participants was 485 MSM. Demographics of the participants are presented in Table 1. The study was an initiative of the Greek Association of People Living with HIV-Positive Voice, in collaboration with the Infectious Diseases Departments (IDDs) of the Fourth Department of Internal Medicine of "Attikon" University Hospital and the First Department of Internal Medicine of "Laiko" General Hospital, as well as the Laboratory of

**Table 1.** Descriptives of demographics.

Variable	All participants <i>n</i> (% of total)
Age	
18–30	174 (36)
31–40	189 (39.1)
41–50	97 (20.1)
51+	23 (4.8)
Residence	
Athens	384 (79.5)
Other urban	65 (13.5)
Rural	34 (7)
Education	
Jr. high	16 (3.3)
Sr. high	59 (12.2)
Prof. school	93 (19.3)
University	200 (41.4)
Postgraduate	115 (23.8)
HIV status	
Negative	186 (38.4)
Positive	299 (61.6)
STI diagnosis <sup>a</sup>	
No	396 (82.8)
Yes	82 (17.2)
Postexposure prophylaxis use <sup>a</sup>	
No	219 (56.7)
Yes	167 (43.3)

<sup>a</sup>In the past 6 mo.

Clinical Research: Subjectivity and Social Bond of the Psychology Department of National and Kapodistrian University of Athens.

Data for the HIV positive MSM participants were collected at the IDD during their scheduled appointments. All IDDs' patients between September to November 2019 with an HIV diagnosis were asked to participate. These two aforementioned IDDs are treating a large population of MSM living with HIV, in the capital of Greece, Athens. Being two of the most sizable HIV clinics in Athens, they treat over 1,200 HIV positive patients, which is more than 10% of people living with HIV in Greece.

Seronegative participants were recruited from the clients attending Athens and Thessaloniki Checkpoint centers, which are services of Positive Voice providing HIV, hepatitis B, and hepatitis C testing, as well as sexual health counseling. They provide their services to a large population of MSM, referring to community-based services for STI testing, at least as far as urban residents are concerned, having diagnosed 37.6% and 48.9% of new MSM HIV cases in Greece in 2018 and 2019, respectively. Data collection from the Checkpoints lasted for 2 mo, January and February 2020. Recruitment in the Checkpoints had to be stopped due to the coronavirus pandemic, which compelled these services to adjust

their operation. In addition, it was decided that the collected data would be biased as a result of the effect of the pandemic and the lockdowns imposed by the Greek government due to it on the participants' sexual behaviors.

### Procedure

Clients of the Checkpoints and patients of IDDs were asked by their counselor or physician, respectively, to participate. Participation in the study was voluntary, without any kind of compensation, and anonymous. Each participant was informed about the study (both verbally and in writing) by their counselor or physician, for the Checkpoints' clients and IDDs patients respectively, at the end of their appointment. In case of agreement, they signed a consent form and filled out the questionnaire on their own in their counselor's or physician's office. Participants were instructed to seal their completed questionnaire in a blank envelope upon completion, in order to maintain anonymity. The research was designed and conducted according to the Helsinki declaration guidelines and its protocol was approved by the bioethics committees of "Attikon" University Hospital and "Laiko" General Hospital.

### Measures

Data were collected through the administration of a self-administered questionnaire based on the screening tool for chemsex proposed by the 56-Dean-Street service (Stuart, 2014). The questionnaire addressed demographics, sexual health, SDU, and chemsex, in particular, as well as their pattern of use and their impact. The items of the screening tool that were used in our study were translated through the application of a backwards translation procedure.

### Demographics

Demographics investigated were (1) age, (2) residence (Athens, other urban cities, rural), and (3) education (junior high school, senior high school, professional school, university, postgraduate education).

**Table 2.** Frequencies of non chemsex substances used in sex.

Substances	Sexualized drug use excluding chemsex <i>n</i> (% of total)	All participants <i>n</i> (% of total)
Cannabis	16 (43.2)	22 (4.5)
Ketamine	1 (2.7)	4 (0.8)
Cocaine	33 (89.2)	132 (27.2)
Crack	1 (2.7)	1 (0.2)
Ecstasy	2 (5.4)	2 (0.4)
LSD	1 (2.7)	1 (0.1)
MDMA	5 (13.5)	10 (2.1)

### Sexual health

Sexual health variables investigated were (1) HIV status (positive or negative), (2) STIs, excluding HIV (diagnosed in the last 6 mo or not), and (3) use of postexposure prophylaxis (during the last 6 mo). The use of PrEP was not examined because it is not provided by the national health-care system in Greece.

### SDU/chemsex

SDU and chemsex use was investigated by asking whether the participants had ever used crystal methamphetamine, mephedrone, GHB/GBL, or any other illegal psychoactive substances, allowing them to state which in an open-ended question. Those that reported at least one of the three substances involved in chemsex were considered chemsex users. Participants reporting the use of substances, other than the aforementioned three, formed the SDU group. The substances reported were cannabis, ketamine, cocaine, crack, ecstasy, LSD, and MDMA. Poppers and alcohol were not considered SDU, as they are legal in Greece.

### Pattern of use

Those that answered positively regarding SDU/chemsex involvement were further asked in the questionnaire to state their (1) last engagement in SDU (less than 6 mo, 6–12 mo, more than 12 mo ago), (2) frequency of SDU/chemsex involvement (once, less frequently than once a month, more frequently than once a month), and (3) percentage of sober sexual life (in the past 6 mo), that is, to state in a scale of 100 what percentage of their sexual life was without the use of drugs.

### SDU/chemsex impact

SDU/chemsex impact was measured by the following questions: (1) “SDU has a negative impact on my life,” (2) “It is more possible not to use a condom when high,” (3) “I do things during

SDU I would not do in sober sex,” and (4) “I can enjoy sober sex.” These items were assessed using a 5-point Likert scale ranging from 1 (*totally disagree*) to 5 (*totally agree*). These items were answered by the participants that had stated involvement in SDU or chemsex. All items used in this study are presented in Tables 2 and 3.

### Statistical analyses

We computed frequencies and descriptives (means, medians, and standard deviations) for the total sample as well as each respective group used in statistical comparisons. Preliminary analyses have shown that missing values were not systematically related to the data. Ratios were compared with chi-square tests and effect sizes were measured with either Phi coefficient when there was one degree of freedom or Cramer’s *V* coefficient for analyses with more degrees of freedom. The comparisons conducted were between SDU (yes or no), as well as particularly chemsex involvement (yes or no) on the one hand and demographic and sexual health on the other hand. Additionally, we compared the frequency of SDU sexual health outcomes and the effect of SDU between MSM not living with HIV and MSM living with HIV, to investigate whether there is an interaction of SDU and HIV status regarding the aforementioned variables. For the dependent variables measured by Likert scales, means were compared with Mann–Whitney *U* nonparametric tests, due to the high difference of sample sizes between seronegative and seropositive MSM involved with SDU. Effect sizes for Mann–Whitney *U* tests were estimated with eta squared coefficient. Participants reporting SDU only once were not included in these analyses, since it was considered that they would bias the results as outliers. The threshold for statistical significance was defined at 0.05. Analyses were

**Table 3.** Demographics and sexual health and their association with sexualized drug use and chemsex.

Variable	No drug use n (% of total)	Sexualized drug use n (% of total)	Phi/Cramer's V	p	Chemsex n (% of total)	Chi-square value	Phi/Cramer's V	p
Age								
18–30	126 (61.5)	48 (23.4)	0.12	0.061	31 (15.1)	10.18	0.15	0.017*
31–40	130 (54.4)	59 (24.7)			50 (20.9)			
41–50	69 (60)	28 (24.3)			18 (15.7)			
51+	22 (95.7)	1 (4.3)			0 (0)			
Residence								
Athens	269 (57)	115 (24.4)	0.08	0.193	88 (18.6)	6.23	0.12	0.044*
Other Urban	50 (69.4)	15 (20.8)			7 (9.7)			
Rural	28 (73.7)	6 (15.8)			4 (10.5)			
Education								
Jr. high	14 (82.4)	2 (11.8)	0.10	0.307	1 (5.9)	4.36	0.09	0.359
Sr. high	41 (56.9)	18 (25)			13 (18.1)			
Prof. school	63 (54.8)	30 (26.1)			22 (19.1)			
University	141 (57.8)	60 (24.6)			43 (17.6)			
Postgraduate	89 (66.4)	26 (19.4)			19 (14.2)			
HIV status								
Negative	152 (74.1)	34 (16.6)	0.17	0.000***	19 (9.3)	19.39	0.21	0.000***
Positive	197 (52)	102 (26.9)			80 (21.1)			
STI diagnosis <sup>a</sup>								
No	296 (63.2)	100 (21.4)	0.15	0.001***	72 (15.4)	10.15	0.15	0.001**
Yes	47 (43.1)	35 (32.1)			27 (24.8)			
Postexposure prophylaxis use <sup>a</sup>								
No	147 (53.1)	72 (26)	–0.04	0.385	58 (20.9)	1.99	–0.08	0.158
Yes	119 (62)	40 (20.8)			33 (17.2)			

<sup>a</sup>In the past 6 mo.\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

**Table 4.** Descriptives of sexual health, sexualized drug use (SDU), and their association with HIV status in men who have sex with men.

Variable	All participants <i>n</i> (% of total)	HIV negative <i>n</i> (% of total)	HIV positive <i>n</i> (% of total)	Chi-square value	Phi/ Cramer's <i>V</i>	<i>p</i>
Last time engaged in SDU						
<6 mo	80 (62.5)	22 (27.5)	58 (72.5)	3.43	0.16	0.180
6–12 mo	20 (15.6)	4 (20)	16 (80)			
>12 mo	28 (21.9)	3 (10.7)	25 (89.3)			
Frequency of SDU						
Once	18 (24)	4 (22.2)	14 (77.8)	1.42	0.14	0.492
Monthly or less	25 (33.3)	6 (24)	19 (76)			
Monthly or more	32 (42.7)	4 (12.5)	28 (87.5)			
% of sober sexual life						
0–30	15 (17.2)	2 (13.3)	13 (86.7)	0.74	0.09	0.689
31–60	13 (14.9)	2 (15.4)	11 (84.6)			
61–100	59 (67.8)	13 (22)	46 (78)			
STI <sup>a</sup>						
No	100 (74.1)	26 (26)	74 (74)	0.50	0.06	0.477
Yes	35 (25.9)	7 (20)	28 (80)			

<sup>a</sup>In the past 6 mo.

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

conducted using the IBM SPSS statistics package, version 25.

## Results

### *SDU and chemsex frequency and association with demographic and sexual health data*

In total, 28% ( $N=136$ ) of the participants had been involved at least once in SDU and 20.4% ( $N=99$ ), particularly in chemsex. Among chemsex users, 71.3% ( $n=67$ ) reported having used crystal methamphetamine, 66.3% ( $N=59$ ) mephedrone and 77.2% ( $n=78$ ) GHB/GBL. The use of more than one substance was reported by 76.3% ( $n=103$ ) of the participants. Among participants not involved in chemsex, cocaine, and cannabis were reported as the most often used by 24.4% ( $n=33$ ) and 11.8% ( $n=16$ ) respectively. The substances reported are included in Table 2.

As shown in Table 3, although there were no significant relationships between SDU and age, there was one between chemsex involvement and age. Chemsex was more prevalent among the 31–40 age group, while none in the 51+ MSM group reported being involved in chemsex. The effect size of this relationship was rather small ( $V=0.15$ ). Similarly, chemsex only and not SDU was significantly related, albeit with a small effect size ( $V=0.12$ ), with residence, meaning that reported chemsex involvement is high among people who live in Athens. Education level was

not significantly related to either SDU or chemsex.

Concerning sexual health, both SDU and chemsex were more frequent among MSM living with HIV with a rather small effect size, similar for both groups (Phi = 0.17 and Phi = 0.21 respectively), according to the Phi coefficients exhibited in Table 3. In addition, MSM reporting SDU or chemsex involvement were significantly more frequently diagnosed with an STI over the past 6 mo, again with the same effect size (Phi = 0.15). Postexposure prophylaxis use was not significantly associated with either SDU or chemsex involvement.

### *SDU frequency, its impact and association with HIV status*

As shown on Table 4, the majority of MSM reporting SDU (62.5%) stated that they were involved in this activity at least once during the past 6 mo. Almost half of them (42.7%) could be considered systematic users as they report SDU at least once per month.

There was no significant relationship between the frequency and last engagement in SDU variables with HIV status,  $\chi^2(2) = 1.42$ ,  $p = 0.492$ . STI diagnosis in the past 6 mo among MSM reporting SDU was not related to HIV status either. These analyses were not conducted for chemsex frequency, and its association with HIV status due to the low number of participants in some conditions.

**Table 5.** Means, medians and standard deviations of the impact of sexualized drug use (SDU) to men who have sex with men involved in SDU not living and living with HIV.

Impact	Living with HIV						U	Eta squared	p
	No (n = 17)			Yes (n = 70)					
	M	Mn	SD	M	Mn	SD			
SDU has negative impact on my life	1.94	2.00	0.97	2.54	3.00	0.56	390.00	0.05	0.014*
More possible not to use condom when high	2.00	2.00	1.00	2.47	3.00	0.78	446.50	0.03	0.068
Doing things in SDU that would not do in sober sex	2.29	3.00	0.85	2.54	3.00	0.76	495.50	0.01	0.201
Can enjoy sober sex	2.94	3.00	0.24	2.72	3.00	0.61	517.00	0.01	0.162

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

Regarding the impact of SDU, according to Mann–Whitney U criterion, as shown in Table 3, the self-perceived adverse impact of SDU on their lives was significantly differentiated between seropositive and seronegative MSM. Seropositive MSM exhibited a worse self-perceived impact from SDU than seronegative MSM. According to the eta squared effect size coefficient, 5% of the self-perceived negative impact of SDU on participants' lives could be attributed to the presence of HIV (Table 5).

## Discussion

To the best of our knowledge, this study is the first to focus on SDU and chemsex regarding MSM living in Greece. Thus, one important contribution is that it adds data that will help map this contemporary global phenomenon. We have identified three major findings related to SDU, chemsex and sexual health. SDU and chemsex rates are considerably high among Greek MSM, especially those living with HIV, attending community testing centers and IDD. SDU and chemsex are related to a higher incidence of STIs, and possibly the risk of HIV transmission. Lastly, the self-perceived negative impact of SDU tended to be higher among MSM living with HIV.

In detail, the rates of SDU and chemsex among MSM in Greece were rather high, reaching 28% and 20.4%, respectively. These rates greatly exceed those reported in the study of Guerras et al. (2021), according to which the rates of SDU (including nonillegal substances and poppers) and chemsex reported in the Greek population were 12.7% and 1.6% respectively. Guerras et al. (2021), however, estimated rates at a country level. The rates found in our study

resemble those found in studies investigating metropolitan cities of the European Union, namely London (30%) (Hegazi et al., 2017), and large German cities (27%) (Bohn et al., 2020). These studies, like ours, were conducted mainly in sexual health clinics. According to Maxwell et al. (2019), SDU and chemsex is more frequently reported among MSM attending such services. This population tends to live in large cities, has a more active sexual life and may well be more open concerning their sexual orientation, all of which are factors positively related to SDU and chemsex (Guerras et al., 2021; Hegazi et al., 2017). Consequently, these venues are ideal sites to screen for SDU and chemsex involvement and incorporate interventions regarding these activities in their services. In addition, since only a minority of our sample (7.6%) reported SDU excluding chemsex related substances, healthcare professionals working in other services that are likely to receive a lot of MSM need to be properly informed and trained in screening and dealing with chemsex, both in terms of harm reduction and referrals.

Regarding the age of MSM engaging in chemsex, which was more frequent among those between 31 and 40, our findings are in line with those of some other studies addressing this matter (Barrett et al., 2019; Bohn et al., 2020; Evers et al., 2020; Sewell et al., 2019). MSM with ages ranging from 31 to 40 would be more likely to purchase the substances involved in chemsex than younger ones would. Moreover, the third decade of life could involve more liberties for the individual to experiment with its sexual life, but it could also present new challenges for nonheteronormative people, such as coming out or not in a wider social context, dealing with HIV-related



stigma and its consequences etc. (Platteau et al., 2015; Poullos, 2020b; Rueda et al., 2016). In this case, it would be more possible both to experiment with chemsex and use it as a means to cope with these challenges that the “adulthood” of the thirties, so to speak, imposes on individuals in the western world. Chemsex, but not SDU, in general, was also significantly more frequent in the metropolitan area of Greece’s capital, Athens. This finding could be attributed to the fact that most of the participants in our study were living in Athens, where, it is worth noting, half of Greece’s population resides. Regarding the high number of participants living with HIV, most people living with HIV tend to reside near large cities, such as Athens, in order to have access to IDD’s for their medication and more anonymity concerning their status. Nonetheless, this finding is in line with other studies (Maxwell et al., 2019; Schmidt et al., 2016) according to which chemsex is more commonly encountered in metropolitan areas of larger cities.

Our study verified the fact that SDU and chemsex are more common among MSM living with HIV (Bourne et al., 2015; Frankis et al., 2018; Hegazi et al., 2017; Maxwell et al., 2019; Pakianathan et al., 2018; Rosińska et al., 2018). MSM involved in SDU tend to engage in high-risk sexual behaviors (Bourne et al., 2018), which are associated with HIV infection. On the other hand, as mentioned previously, this could also be attributed to the fact that SDU could be the means to deal with the psychosocial and relational stigma of living with HIV (Amaro, 2016; Bourne et al., 2015; Platteau et al., 2019; Poullos, 2019, 2020a, 2020b; Power et al., 2018; Smith & Tasker, 2018). From another perspective, after an HIV diagnosis, many MSM on antiretroviral medication are no longer afraid to transmit the virus and apparently to be infected by it. Thus, they may feel liberated to experiment in other ways of connection, or sexual practices, such as chemsex, which they would not try before in fear of getting infected (Poullos, 2020b).

In relevance with the previous findings, we also verified that SDU is more common among those who have been diagnosed with an STI. This is a common finding and, more importantly, a reason that many researchers and mental health

services are interested in investigating SDU and chemsex, to understand the relationship between them and appropriately deal with it (Bourne et al., 2018). Many studies conclude that condomless sex and the consequent STI diagnosis in the past 6 mo is quite probable in the setting of SDU and chemsex, due to higher excitement and lower inhibitions (Benotsch et al., 2012; Bourne et al., 2015; Frankis et al., 2018; Glynn et al., 2018; Melendez-Torres et al., 2017).

Moreover, another interesting indication of our findings is that MSM living with HIV report worse self-perceived impact of SDU on their lives compared to seronegative MSM. According to other studies, MSM living with HIV report problems with the physical quality of life and overall worse quality of life, in contrast to MSM not living with HIV. This could be attributed, at least to some extent, to the HIV stigma (Balderson et al., 2013; Castro et al., 2018; Rueda et al., 2016). Despite SDU among HIV positive MSM being more common than with MSM not living with HIV, the frequency of drug use was not. This could mean that the worse impact of SDU among HIV positive MSM could not be attributed to the frequency of drug use itself. Consequently, this finding lends support to the fact that, apart from physical sexual health, there are other issues to be addressed among MSM, especially those living with HIV, such as mental health and social life. As Pakianathan et al. (2016) support, focusing solely on the risk of HIV and STI diagnosis in the past 6 mo as far as MSM are concerned, neglects an important number of health issues. Seropositive MSM engaging with SDU and chemsex face a number of intersectional stigmas including living with HIV, internalized and social homophobia and the stigma of substance use (Amaro, 2016; Platteau et al., 2019; Poullos, 2019, 2020b). Stigma and particularly HIV-related stigma are established as a definite risk factor for worse health-related outcomes (Miners et al., 2014; Rueda et al., 2016). Besides, under such circumstances, if SDU and chemsex were used as self-medication (Khantzian, 1985), to cope with issues such as the aforementioned, it would be all the more probable to erase their recreational effect and make them problematic (Platteau et al., 2019).

## Limitations and implications for further research

This study has some limitations that further research should address. The sample, despite being adequate for drawing some conclusions, was rather small, possibly limiting the external validity of our findings. For instance, Mann–Whitney U tests involved comparisons between highly unequal groups, sizewise, where seronegative MSM group size was quite small. Consequently, the results of those analyses could be interpreted as tendencies that need verification with further research. The sample size also hindered the capability to conduct more sophisticated statistical modeling. For example, logistic regressions that could address the interrelation of variables, like HIV and place of residence, as discussed previously, warrant further study. Unfortunately, we conducted some statistical analyses regarding SDU only and not specifically chemsex substances, as in the latter case, there were too many crosstab cells (often more than 50%) with frequencies less than 5, something that would render any results unreliable. Some age groups, especially older adults, education levels lower than university, and places of residence other than Athens were also rather under-represented. The same could be said for MSM not living with HIV as the sampling had to stop due to the pandemic. Lastly, there was no heterosexual control group that would add to the validity of some findings. The use of PrEP, despite being an important sexual health variable, was also not assessed due to its very low rate of use in Greece.

Further research should manage to reach a larger sample, most probably through online recruitment, as that is considered more appropriate for investigating socially sensitive issues such as HIV status, sexual practices and drug use. Besides, as mentioned before, Maxwell et al. (2019) supports that data collected in sexual health clinics and community services could overestimate chemsex rates, something that also supports further research conducted online to bear reliable results on a national level. Data such as the onset of SDU engagement in relation to HIV diagnosis and intravenous versus other modes of drug use would greatly lend detail to

our findings. Lastly, further research should be conducted concerning the effects of SDU and chemsex on the quality of life, as well as physical and mental health, particularly of seropositive MSM, to have a more detailed picture of their needs and thus provide meaningful services.

## Conclusion

SDU and chemsex are existing, if not still rising, phenomena in Greece and particularly Athens, in a similar manner to other metropolitan cities of Europe. This is especially relevant for clients and patients of community testing centers and IDDIs respectively, where it is particularly important to incorporate SDU screening processes. Meanwhile, the aforementioned facilities are the most appropriate to offer services like harm reduction, psychological support for substance use and safe sexual practices in this context and consultation for sexual health in general (Ford et al., 2019, 2021) and consent issues. The results of such community-based services elsewhere (Stuart & Weymann, 2015) justify the importance of creating similar agencies in cities with a high prevalence of SDU and chemsex. Despite the fact that there is no certain definition of problematic chemsex, SDU and chemsex among MSM often become an issue when control is lost during the pursuit of pleasure or when they are the sole means of coping with sexual inhibitions caused by discrimination and stigma (Platteau et al., 2019; Poulios, 2020a). By acknowledging the pleasure aspect of SDU and chemsex and normalizing these practices, healthcare providers and public health communities can better support men in engaging in sexual pleasure exploration in a way that does not jeopardize their health (Ford et al. 2021). Specifically, in Greece and other countries that chemsex is still rather unknown among healthcare providers, there is an even greater need for them to get informed and trained, as well as to create appropriate, affirmative, intersectional LGBTQI+ services, specializing in the needs and issues of the MSM population engaging with SDU. Lastly, it has to be underlined that, apart from HIV and STI diagnosis, it is also imperative to pay more attention to the psychosocial needs of MSM already

living with HIV and probably engaging with SDU and chemsex to ameliorate the problems they face with appropriate interventions and services. Even though HIV no longer leads to a terminal illness, people living with it still face stigma related problems, intersecting with others, such as homophobia and discrimination, that need to be addressed (Bourne et al., 2015; Rueda et al., 2016).

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