

## Concern about drug use among gay, bisexual, and other men who have sex with men engaged in chemsex sessions in Spain

### *Preocupación por el consumo de drogas entre hombres gays, bisexuales y otros hombres que tienen sexo con hombres usuarios de chemsex en España*

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## **Resumen**

**Introducción:** El chemsex, una actividad recreativa y ocasional para la mayoría de los hombres gais, bisexuales y otros hombres que tienen sexo con hombres (GBHSH) que lo practican, se ha asociado a consecuencias negativas en distintas esferas de la salud. Sin embargo, apenas existe evidencia sobre la preocupación por el consumo de drogas entre usuarios de chemsex. **Objetivos:** Estimar la proporción de hombres GBHSH usuarios de chemsex preocupados por su consumo de drogas e identificar sus principales determinantes, así como las drogas asociadas a mayor preocupación. **Materiales y métodos:** Se realizó un estudio online entre mayo y julio de 2020, en el que se analizaron 779 hombres GBHSH que habían participado en sesiones de chemsex en los últimos 12 meses. Se estimó la prevalencia de preocupación por consumo de drogas y se realizó un análisis multivariante para identificar los factores asociados mediante regresión de Poisson con varianza robusta. **Resultados:** La preocupación por consumo de drogas en los últimos 12 meses (31,6%) se asoció de forma independiente con: tener menos de 40 años, haber pagado dinero a cambio de sexo, el consumo de las drogas más asociadas con la práctica del chemsex, así como con el consumo regular y la inyección de drogas en cualquier circunstancia. Metanfetamina y mefedrona fueron las drogas que más preocuparon a los usuarios de chemsex. **Conclusión:** Se evidencia la necesidad de implementar medidas dirigidas a identificar y favorecer el acceso de los usuarios de chemsex preocupados por su consumo de drogas a los recursos sociosanitarios. Asimismo, es importante incrementar la conciencia acerca de los riesgos asociados al consumo de drogas en esta población, especialmente entre los usuarios con patrones potencialmente problemáticos como el uso regular o inyectado de drogas.

## **Palabras clave**

Chemsex; consumo de drogas; preocupación; GBHSH.

## **Abstract**

**Introduction:** Chemsex, a recreational and occasional activity for the majority of gay, bisexual, and other men who have sex with men (GBMSM) who engage in it, has been associated with negative consequences in various health spheres. However, there is scarce evidence regarding concerns about drug use among chemsex users. **Objectives:** To estimate the proportion of GBMSM engaged in chemsex who are concerned about their drug use and identify its main determinants, as well as the drugs associated with greater concern. **Materials and Methods:** An online study was conducted between May and July 2020, analyzing 779 GBMSM engaged in chemsex sessions in the last 12 months. The prevalence of concern about drug use was estimated, and a multivariate analysis was performed to identify associated factors using Poisson regression with robust variance. **Results:** Concern about drug use in the last 12 months (31.6%) was independently associated with being under 40 years old, having paid for sex, the use of drugs most associated with chemsex practice, as well as regular drug use and drug injection in any circumstance. Methamphetamine and mephedrone were the drugs that most concerned chemsex users. **Conclusion:** These results show the need to implement measures aimed at identifying and promoting the access of chemsex users concerned about their drug use to social and health resources. Likewise, it is important to increase awareness about the risks associated with drug use in this population, especially among users with potentially problematic patterns such as regular or injecting drug use.

## **Keywords**

Chemsex; drug use; concern; GBMSM.



## INTRODUCTION

Various recent studies highlight the growth trend in drug use among gay, bisexual, and other men who have sex with men (GBMSM) (Coyer et al., 2022; Hampel et al., 2020). This could be partially explained by the emergence and spread of new psychoactive drugs, as well as the expansion of new patterns of use, with a notable emphasis on sexualized drug use (Sewell et al., 2018). There are different types of recreational drug use in a sexual context, among which chemsex is a specific modality associated with gay sexual culture (Stuart, 2019). In Spain, chemsex has been defined as the intentional use of drugs with the purpose of engaging in sexual activities for an extended period, ranging from hours to several days (Fernández-Dávila, 2016).

In Spain, over the past few years, several studies have been conducted in an attempt to approximate the frequency of chemsex practices among the GBMSM community, with prevalence data referring to the last 12 months ranging from 7.5% to 51% (García-Pérez et al., 2022; González-Baeza et al., 2018; Guerras et al., 2022a; Iniesta et al., 2018; Ministerio de Sanidad, 2020; Stop et al., 2021). These variations could be explained by factors such as the study population, the type of recruitment, or the definition of chemsex adopted by the authors.

One of the aspects that significantly influences the comparability among studies on the prevalence of chemsex is the use of closed lists of specific drugs to define this practice, with considerable variability among authors. While the initial British definitions limited chemsex to the use of methamphetamine, mephedrone, and gamma-

hydroxybutyric acid (GHB) (Bourne et al., 2014), subsequent works added ketamine due to its high frequency of use in this context (Edmundson et al., 2018). In contrast, other authors have approached the definition of chemsex by linking it to its identity with queer sexual culture (Hakim, 2019) and gay culture (Santoro et al., 2020). It is worth noting that studies defining chemsex based on closed drug lists tend to overlook characteristic elements such as the duration of sexual practices, the locations or contexts in which they occur, forms of drug use, or the significance of these practices for the users themselves.

The possible negative consequences of chemsex on men's health have been studied in recent years. An association has been identified between chemsex practices and unprotected anal intercourse (Guerras et al., 2021), injected drug use (Hegazi et al., 2017), and the diagnosis of HIV and other sexually transmitted infections (STIs) (Ne-vendorff et al., 2023). Additionally, in cities like Barcelona, an increase in emergency room visits has been observed due to acute drug intoxication episodes associated with chemsex (Vallecillo et al., 2022). In severe cases, chemsex drug overdoses, particularly with GHB, can lead to death (Corkery et al., 2018).

In addition to its impact on physical health, chemsex has also been linked to potential negative effects on work and social relationships (Leyva-Moral et al., 2023; Whitlock et al., 2021), various mental health issues, including depressive symptoms (Dolengevich-Segal et al., 2019), anxiety (Card et al., 2020), and psychosis (Moreno-Gómez et al., 2022). Substance dependence and suicidal ideation (Batisse et al., 2016),



have also been associated with chemsex, especially among individuals who inject drugs during sessions (Dolengevich-Segal et al., 2019). It is important to note that the cross-sectional nature of most studies does not allow for the establishment of causal relationships. Furthermore, the extent to which these negative consequences may be related to the stigmatization of chemsex users is not considered.

There have been few studies investigating health-related concern among GBMSM engaged in chemsex. The limited available research has primarily focused on estimating the proportion of chemsex users seeking consultation with various professionals such as primary care physicians, psychologists, general psychiatrists, substance abuse treatment specialists, STI clinics, sexual health professionals, or community program workers (Blomquist et al., 2020; Demant et al., 2022; Tomkins et al., 2018).

In recent years, there has been a significant increase in treatment demands related to chemsex in Spain. The requests for treatment in addiction care centers in Madrid multiplied by seven between 2017 and 2021 (Madrid Salud, 2022). In Barcelona, treatment requests related to chemsex practices increased from representing 1.5% in 2016 to exceeding 5% of total admission requests in addiction care and follow-up centers in 2020 (Agència de Salut Pública de Barcelona, 2021).

While these studies provide a partial view of the growing magnitude of the problem, an exclusive focus on healthcare service use could underestimate the concern about drug use among chemsex users. This approach might overlook those who,

despite being concerned about their drug use, have not taken the step to seek help (Evers et al., 2020; Hibbert et al., 2021). In this sense, self-reported concern about drug use can serve as an indicator of the need for socio-health intervention among chemsex users.

In Spain, among the GBMSM participants in the HOMOSALUD study (Stop et al., 2021), 29.4% of those who had practiced chemsex in the last 12 months expressed concern about drug use associated with this practice. However, fewer than half of the concerned participants had sought help from a socio-health service. Another recent study conducted in Barcelona (García-Pérez et al., 2022) indicated that 31.6% of participants in chemsex sessions in the past year were concerned about their health and drug use patterns. However, neither of these studies characterized the profile of men concerned about their drug use nor identified whether certain drugs caused more concern than others.

Therefore, with the aim of guiding intervention needs related to drug use among GBMSM engaged in chemsex, the objectives of this study are: to estimate the proportion of chemsex users who are concerned about their drug use, identify the main determinants of concern, and understand which drugs are their primary sources of worry.

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## METHODS

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### Study design and participant recruitment process

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A cross-sectional study was conducted between May and July 2020 targeting GBMSM residing in Spain. Participants



were recruited through various online resources with the aim of ensuring maximum variability and heterogeneity among the participants. The study was nationally disseminated through apps and websites catering to lesbian, gay, bisexual, transgender, intersex, and other identities and orientations included in the LGBTI+ spectrum. Additionally, collaboration with influencers who promoted the study on platforms such as YouTube® and Instagram® was sought. Distribution lists and websites of three community based programs were also used.

When individuals clicked on the study banner or link, they were automatically directed to an initial screen providing information about the study's objectives and content. Participants were cisgender men over 16 years of age who had engaged in anal intercourse with other men at some point in their lives. Our analysis focused specifically on those who reported participating in chemsex sessions in the last 12 months. Chemsex sessions were defined as those involving the intentional use of drugs to enhance special sexual experiences, characterized by longer duration, involvement with a greater number of individuals, and engaging in various practices. The analyzed sample consisted of 779 participants.

### **Information collection instrument and variables**

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An online electronic questionnaire was designed, comprising the following sections: sociodemographic characteristics, sexual behavior, history of HIV testing and serological status, diagnosis of sexually transmitted infections (STIs), use of pre-exposure

prophylaxis (PrEP), use of psychoactive drugs (distinguishing between use in any context and sexualized use), and concern related to drug use.

Participants were asked about their use of the following drugs: amyl nitrate (poppers), cannabis, cocaine, heroin, amphetamine, methamphetamine, ecstasy, GHB, mephedrone, or ketamine. In this study, "sexualized use of drugs most associated with chemsex" was defined as the use of GHB, mephedrone, methamphetamine, and / or ketamine within the 6 hours before or during anal sex, regardless of the use of other drugs. "Sexualized use of drugs least associated with chemsex" was defined as the use of poppers, cocaine, cannabis, ecstasy, amphetamine, and / or heroin within the 6 hours before or during anal sex. Additionally, "regular drug use" was considered as having consumed any of the ten drugs listed on more than 50 days in the past 12 months in any context. This frequency essentially equates to having used drugs at least once a week in the last year.

### **Statistical analysis**

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Firstly, we conducted a descriptive analysis of the main characteristics of the sample (sociodemographic, sexual behavior, history of HIV testing and serological status, STI diagnosis, and PrEP use), by concern about drug use in the last 12 months: concerned and not concerned. Differences were assessed using the chi-square test.

Secondly, the prevalence of sexualized drug use in the last 12 months (recent use), as well as regular drug use ( $\geq 1$  day per week) and injected drug use in any context in the last 12 months, was estimated. Once



again, the analysis was stratified into two groups: concerned and not concerned about drug use, and differences were assessed using the chi-square test.

Subsequently, we estimated the proportion of men who reported having participated in chemsex sessions in the last 12 months and were concerned about their drug use. Associated factors were identified through Poisson regression models with robust variance, calculating crude prevalence ratios (cPR) and adjusted prevalence ratios (aPR), along with 95% confidence intervals (95% CI). Variables with a significance level of  $p < 0.20$  in the crude analysis were introduced into the initial multivariable model. Akaike's information criterion and Bayesian information criterion were used to evaluate different models and select the final model.

Finally, the proportion of GBMSM with sexualized use of each drug who expressed concern primarily about the use of that drug was estimated.

All statistical analyses were performed using Stata v. 17 (Statacorp., College Station, TX).

## Ethical implications

Informed and voluntary consent was obtained from all participants before starting the survey. Participants confirmed that they were of legal age to consent to sexual relations with adults. No financial incentives were provided to participants. The questionnaire was anonymous and confidential, without collecting information that could identify participants personally or record IP addresses of the devices used for completion. The study received

approval from the Research Ethics Committee of the Carlos III Health Institute (CEI PI 35\_2020-v3).

## RESULTS

### General characteristics of the participants

As seen in Table 1, eight out of ten participants were recruited through LGBTI+ contact applications or websites. The average age was 39 years. Most men were born in Spain, had university education, and had a comfortable or very comfortable economic situation. They resided in locations with over one hundred thousand inhabitants and were open about their sex life.

Six out of ten had exclusively engaged in sexual relationships with men throughout their lives. In the last year, almost half had engaged in unprotected sex with ten or more men, and one-fifth had either paid for or received money in exchange for sex. Almost one in three had an HIV diagnosis, and a slightly higher proportion had been diagnosed with some STIs in the last 12 months. Lastly, one in ten men was taking PrEP daily.

Among participants involved in chemsex sessions who were concerned about their drug use, we observed a higher proportion of men were observed to: be between 30 and 39 years of age, who reported unprotected sex with ten or more men, having paid for sex, living with HIV, having received an STI diagnosis, and daily PrEP use than in unconcerned men. These differences were statistically significant (Table 1).



**Table I.** General characteristics of the sample of GBMSM<sup>1</sup> engaged in chemsex sessions in the last 12 months according to their concern about drug use (n=779).

	<b>Total</b>		<b>Concerned</b>		<b>Not concerned</b>		<b>p-value</b>
	<b>N=779</b>		<b>N=246</b>		<b>N=533</b>		
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	
<b>Sociodemographic characteristics</b>							
<b>Recruitment site</b>							
LGBTI+ contact apps or websites	637	81,8	210	85,4	427	80,1	<b>0,026</b>
Other social networks	125	16,0	28	11,4	97	18,2	
Community programs	17	2,2	8	3,2	9	1,7	
<b>Age (years)</b>							
< 30 years	171	22,0	56	22,8	115	21,6	<b>0,011</b>
30 - 39 years	241	30,9	92	37,4	149	28,0	
≥ 40 years	367	47,1	98	39,8	269	50,4	
<b>Country of birth</b>							
Spain	582	74,7	181	73,6	401	75,2	0,708
Latin America	159	20,4	50	20,3	109	20,5	
Europe	34	4,4	13	5,3	21	3,9	
Others	4	0,5	2	0,8	2	0,4	
<b>Educational level</b>							
None or primary or secondary compulsory education	69	8,9	25	10,2	44	8,3	0,599
Higher secondary or vocational training	254	32,6	76	30,9	178	33,4	
University	456	58,5	145	58,9	311	58,3	
<b>Economic situation</b>							
Very comfortable / comfortable	451	61,9	129	58,1	322	63,5	0,302
Tight	213	29,2	69	31,1	144	28,4	
Difficult	65	8,9	24	10,8	41	8,1	
<b>Population of the place of residence</b>							
> 1 million	325	44,6	113	50,7	212	42,0	0,094
100.000 - 1 million	213	29,3	58	26,0	155	30,7	
< 100.000	190	26,1	52	23,3	138	27,3	
<b>Lives his sexual life with men...</b>							
Openly	498	63,9	169	68,7	329	61,7	0,068
Discreetly	238	30,6	69	28,0	169	31,7	
Hidden or in complete secrecy	43	5,5	8	3,3	35	6,6	

(table continued on next page)



	<b>Total</b>		<b>Concerned</b>		<b>Not concerned</b>		<b>p-value</b>
	<b>N=779</b>		<b>N=246</b>		<b>N=533</b>		
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	
<b>Sexual behavior</b>							
<b>Sexual relations only with men</b>	465	59,7	149	60,6	316	59,3	0,735
<b>Number of men with whom participant had condomless sex*</b>							
None	76	9,7	18	7,3	58	10,9	<b>0,001</b>
< 10	345	44,3	91	37,0	254	47,6	
≥ 10	358	46,0	137	55,7	221	41,5	
<b>Has paid for sex*</b>	159	20,4	62	25,3	97	18,2	<b>0,022</b>
<b>Has been paid for sex*</b>	167	21,5	54	22,0	113	21,2	0,822
<b>History of HIV diagnosis, other STIs<sup>2</sup> and PrEP<sup>3</sup> use</b>							
<b>HIV test and serological status</b>							
Never been tested	47	6,0	10	4,1	37	6,9	<b>0,021</b>
HIV negative	486	62,4	143	58,1	343	64,4	
HIV positive	246	31,6	93	37,8	153	28,7	
<b>STI diagnosis</b>							
Never	216	28,0	52	21,2	164	31,1	<b>0,001</b>
Over 12 months ago	257	33,3	75	30,6	182	34,5	
In the last 12 months	299	38,7	118	48,2	181	34,4	
<b>Daily PrEP use**</b>	52	10,6	21	15,4	31	8,7	<b>0,030</b>

<sup>1</sup>GBHSH: Gay, bisexual, and other men who have sex with men; <sup>2</sup>STIs: Sexually transmitted infections; <sup>3</sup>PrEP: Pre-exposure prophylaxis; \*In the last 12 months; \*\*Among HIV negative participants or those who have never been tested.

## Prevalence and patterns of drug use

The most consumed drugs in the last 12 months in a sexual context by chemsex users were poppers, GHB, and cocaine. Conversely, those consumed less frequently were ketamine, amphetamine, and heroin. More than half of the participants had consumed some of the drugs most associated with the practice of chemsex (GHB, mephedrone,

methamphetamine, or ketamine), regardless of the use of other drugs (Table 2).

Four out of ten were regular drug users, and 13.3% had injected drugs in any context. The prevalence of drug injection was twice as high among those who reported sexualized use of methamphetamine (28.7%), mephedrone (27%), or ketamine (26.5%) compared to the overall sample (data not included in Table 2).





**Table 2.** Prevalence and patterns of drug use among GBMSM<sup>1</sup> engaged in chemsex sessions in the last 12 months according to their concern about drug use (n=779)

	Total		Concerned		Not concerned		p-value
	N=779		N=246		N=533		
	N	%	N	%	N	%	
<b>Sexualised drug use<sup>2</sup></b>	779	100,0	246	100,0	533	100,0	
<b>Popper</b>	695	89,2	216	87,8	479	89,9	0,388
<b>GHB</b>	336	43,1	134	54,5	202	37,9	<b>0,000</b>
<b>Cocaine</b>	276	35,4	97	39,4	179	33,6	0,113
<b>Mephedrone</b>	272	34,9	115	46,8	157	29,5	<b>0,000</b>
<b>Cannabis</b>	256	32,9	74	30,1	182	34,2	0,262
<b>Methamphetamine</b>	183	23,5	77	31,3	106	19,9	<b>0,000</b>
<b>Ecstasy</b>	155	19,9	54	22,0	101	19,0	0,329
<b>Ketamine</b>	113	14,5	51	20,7	62	11,6	<b>0,001</b>
<b>Amphetamine</b>	104	13,4	45	18,3	59	11,1	<b>0,006</b>
<b>Heroin</b>	2	0,3	1	0,4	1	0,2	0,575
<b>Drug type</b>							
Most associated with chemsex <sup>3</sup>	424	54,4	164	66,7	260	48,8	<b>0,000</b>
Least associated with chemsex <sup>4</sup>	355	45,6	82	33,3	273	51,2	
<b>Regular drug use (≥ 1 day/week)</b>	322	41,3	127	51,6	195	36,6	<b>0,000</b>
<b>Drug injection<sup>5</sup></b>	97	13,3	57	25,5	40	7,9	<b>0,000</b>

<sup>1</sup>GBHSH: Gay, bisexual, and other men who have sex with men; <sup>2</sup>Use of any drug in the 6 hours before or during anal sex; <sup>3</sup>Use of GHB, mephedrone, methamphetamine, and/or ketamine in the 6 hours before or during anal sex, regardless of the use of other drugs; <sup>4</sup>Use of popper, cocaine, cannabis, ecstasy, amphetamine, and/or heroin in the 6 hours before or during anal sex; <sup>5</sup>Injected use of any drug in any context.

Compared to men who did not express concern about their drug use in the last year, those who were concerned presented a higher prevalence of sexualized use of the following drugs: GHB, mephedrone, methamphetamine, ketamine, and amphetamine. Consequently, the overall prevalence of sexualized drug use, especially those associated with the practice of chemsex, was also higher. Additionally, they also presented a higher prevalence of regular drug use, and notably,

injected drug use was more than three times higher in the concerned group. These differences were statistically significant (Table 2).

### Prevalence and factors associated with concern about drug use

Overall, 31.6% (95% CI: 28.3-35.0) of participants who attended chemsex sessions in the last 12 months expressed concern about their drug use, as shown in Table 3.



In the multivariate analysis, concern was independently associated with being under 40 years old (aPR 1.3, 95% CI 1.1-1.6), having paid for sex in the last 12 months (aPR 1.3, 95% CI 1.0-1.6), sexualized use of drugs most associated with chemsex (aPR 1.4, 95% CI 1.1-1.7), regular drug use in any context (aPR 1.4, 95% CI 1.1-1.7), and drug injection in any context (aPR 1.9, 95% CI 1.5-2.4).

### Drugs of greatest concern

Participants who were concerned about their drug use in the last year were asked which drug primarily worried them. Figure 1 represents the proportion of users of each drug who expressed primary concern about the sexualized use of that drug. Heroin has been excluded from this analysis, as its prevalence for sexual relations was anecdotal, as shown in Table 2.

**Tabla 3.** Prevalence and factors associated with concern about drug use among GBMSM<sup>1</sup> engaged in chemsex sessions in the last 12 months (n=779). Crude and adjusted analysis

	(%)	RPc <sup>2</sup>	IC 95% <sup>3</sup>	RPa <sup>4</sup>	IC 95%
<b>TOTAL</b>	31,6				
<b>Sociodemographic characteristics</b>					
<b>Age (years)</b>					
< 40 years	35,9	<b>1,3</b>	1,0 - 1,7	<b>1,3</b>	1,1 - 1,6
≥ 40 years	26,7	1,0		1,0	
<b>Country of birth</b>					
Spain	31,1	1,0			
Latin America	31,5	1,0	0,7 - 1,4		
Others	39,5	1,3	0,7 - 2,1		
<b>Educational level</b>					
No university studies	31,3	1,0			
University studies	31,9	1,0	0,8 - 1,3		
<b>Economic situation</b>					
Very comfortable / comfortable	28,6	1,0			
Tight / difficult	33,5	1,2	0,9 - 1,5		
<b>Population of the place of residence</b>					
> 1 million	34,8	1,3	1,0 - 1,7		
≤ 1 million	27,3	1,0			
<b>Lives his sexual life with men...</b>					
Openly	33,9	1,2	0,9 - 1,6		
Discreetly / hidden / in complete secrecy	27,4	1,0			

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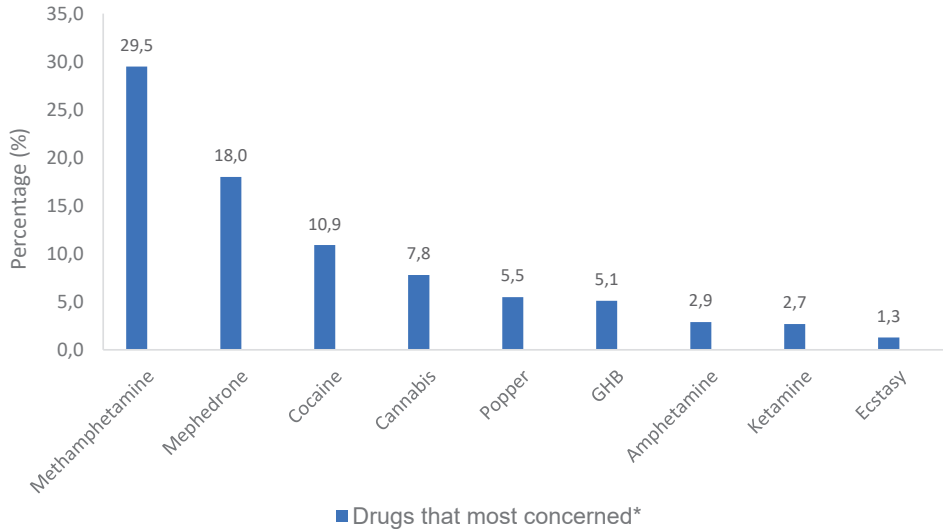


	(%)	RPc <sup>2</sup>	IC 95% <sup>3</sup>	RPa <sup>4</sup>	IC 95%
<b>Sexual behavior</b>					
<b>Sexual relations only with men</b>					
No	30,9	1,0			
Yes	32,0	1,0	0,8 - 1,3		
<b>Number of men with whom participant had condomless sex*</b>					
None o <10	25,9	1,0			
≥ 10	38,3	<b>1,5</b>	1,1 - 1,9		
<b>Has paid for sex*</b>					
No	29,6	1,0		1,0	
Yes	39,0	1,3	1,0 - 1,8	<b>1,3</b>	1,0 - 1,6
<b>Has been paid for sex*</b>					
No	31,4	1,0			
Yes	32,3	1,0	0,8 - 1,4		
<b>History of HIV diagnosis, other STIs<sup>5</sup> and PrEP<sup>6</sup> use</b>					
<b>HIV test and serological status</b>					
Never been tested / HIV negative	28,7	1,0			
HIV positive	38,8	<b>1,3</b>	1,0 - 1,7		
<b>STI diagnosis</b>					
Never	24,1	1,0			
Over 12 months ago	29,2	1,2	0,9 - 1,7		
In the last 12 months	39,5	<b>1,6</b>	1,2 - 2,3		
<b>Daily PrEP use**</b>					
No	26,1	1,0			
Yes	40,4	1,5	1,0 - 2,5		
<b>Drug use*</b>					
<b>Sexualised drug use<sup>7</sup></b>					
Most associated with chemsex <sup>8</sup>	38,7	<b>1,7</b>	1,3 - 2,2	<b>1,4</b>	1,1 - 1,7
Least associated with chemsex <sup>9</sup>	23,1	1,0		1,0	
<b>Regular drug use (≥ 1 day/week)</b>					
No	26,0	1,0		1,0	
Yes	39,4	<b>1,5</b>	1,2 - 1,9	<b>1,4</b>	1,1 - 1,7
<b>Drug injection<sup>10</sup></b>					
No	26,3	1,0		1,0	
Yes	58,8	<b>2,2</b>	1,7 - 3,0	<b>1,9</b>	1,5 - 2,4

<sup>1</sup>GBHSH: Gay, bisexual, and other men who have sex with men; <sup>2</sup>cPR: Crude prevalence ratio; <sup>3</sup>95% CI: 95% confidence interval; <sup>4</sup>aRP: Adjusted prevalence ratio; <sup>5</sup>STIs: Sexually transmitted infections; <sup>6</sup>PrEP: Pre-exposure prophylaxis; <sup>7</sup>Use of any drug in the 6 hours before or during anal sex; <sup>8</sup>Use of GHB, mephedrone, methamphetamine, and/or ketamine in the 6 hours before or during anal sex, regardless of the use of other drugs; <sup>9</sup>Use of popper, cocaine, cannabis, ecstasy, amphetamine, and/or heroin in the 6 hours before or during anal sex; <sup>10</sup>Injected use of any drug in any context; <sup>11</sup>In the last 12 months; <sup>12</sup>Among HIV negative participants or those who have never been tested



**Figure 1.** Drugs that most concerned GBMSM engaged in chemsex sessions in the last 12 months (n=779)



<sup>1</sup>GBMSM: Gay, bisexual, and other men who have sex with men; \*The percentage has been calculated based on the number of GBMSM with sexualized drug use in the last 12 months

The drugs that most worried recent users were methamphetamine (29.5% of the total users of this drug in a sexual context were primarily concerned about its use), mephedrone (18%), and cocaine (10.9%). In contrast, amphetamine (2.9%), ketamine (2.7%), and ecstasy (1.3%) were the least worrisome.

## DISCUSSION

In the present study, approximately one in three chemsex users claimed to feel concerned about their drug use in the last 12 months. Other studies within the same population, but recruited from STI clinics, have approached the concern with broader questions, such as the desire to speak with a

healthcare professional about drug use in a sexual context, finding results similar to ours. In the Netherlands, 23% of chemsex users would like to receive professional advice on their sexualized drug use, and in Ireland, it is 31% (Evers et al., 2020; Glynn et al., 2018). Across European countries participating in the latest edition of the EMIS study (the European Men-who-have-sex-with-Men Internet Survey), targeting gay, bisexual, and other men who have sex with men, in 2017, 12.5% of drug-consuming GBMSM expressed concern about their use (European Centre for Disease Prevention and Control et al., 2019). It is important to note that this inquiry was about drug use in any context and not specifically linked to chemsex practices.



At the national level, our data align with the HOMOSALUD study, where 29.4% of participants engaging in chemsex in the last 12 months (Stop et al., 2021) expressed concern about their drug use. Incera-Fernández analyzed the personal perception of using drugs to facilitate, prolong, or intensify sexual relationships, finding that 29.2% of GBMSM who used drugs for this purpose in the last 18 months expressed a desire to control it (Incera-Fernández et al., 2023). Another recent study based on GBMSM attending an STI diagnostic center in Barcelona found that 31.6% of chemsex users in the last year expressed concern about their health and drug use patterns (García-Pérez et al., 2022), a figure that reduced to 23.4% when referring to drug users in any context. In the EMIS-Spain study of 2017, one in five participants who consumed drugs in any context was concerned (Ministerio de Sanidad, 2020), suggesting a higher concern for drug use in the context of chemsex compared to recreational use in any context.

Similar to the results of EMIS Spain, we observe that concern is accentuated among younger participants. The increased concern in the younger age group could be attributed to a combination of factors, including the exploration of sexual identity, a propensity for experimentation, the search for social acceptance, feelings of belonging to a group, as well as less developed coping skills, experience, and risk perception (Marshal et al., 2008).

Although the relationship between chemsex practices and sex in exchange for money and other goods has been previously described (Armstrong et al., 2021; Guerras et al., 2021), we have not found other studies examining concern about drug use in those who report transactional sex in

the context of chemsex. Paying for sex may reflect greater difficulty of engaging in mutually attracted sexual encounters without economic compensation and may also indicate increased feelings of loneliness, lack of support networks, or low self-esteem, which could contribute to concern about drug use as a way of coping with these negative feelings. However, these are hypotheses, and additional research is needed to fully understand this association, as the available evidence is scarce and mostly derived from the study of heterosexual male populations (Milrod & Weitzer, 2012; Sanders, 2008).

Participants in our study who regularly used drugs also showed greater concern. In this regard, a recent study in Taiwan found an association between higher frequency of drug use and attendance in some form of group therapy or mental health consultations among chemsex users (Hung et al., 2023). Similarly, in Spain, Incera-Fernández's work found that the perception of sexualized use of drugs as something that needed to be controlled was greater among participants who consumed at least once a week compared to those who consumed sporadically (Incera-Fernández et al., 2023).

On the other hand, GBMSM who had injected drugs in any context during the last year expressed greater concern about drug use (58.8%), than that observed among non-injectors (26.3%). In a recent study conducted in the Netherlands, nearly half of the participants who had ever injected drugs before or during sex (a phenomenon known as "slamming") expressed feelings of loss of control or concern regarding their drug use (Knoops et al., 2022). Our study's finding of heightened concern among regular drug users and those who inject drugs is consist-



ent with previous research, demonstrating that these more severe and intense usage patterns are commonly associated with poorer health outcomes (Bui et al., 2018; Degenhardt et al., 2011).

The increased concern found among users of drugs traditionally associated with chemsex practices (GHB, methamphetamine, mephedrone, and ketamine) aligns with recent descriptions by other authors (Blomquist et al., 2020; Bowden-Jones et al., 2017). This association may be related to both the high prevalence of use in this context and the specific risks associated with each drug. In fact, methamphetamine and mephedrone were the drugs that most concerned participants in our study and were also among the top three for GBMSM attending an addiction treatment clinic in London (Bowden-Jones et al., 2017). According to the PAUSA program report (PAUSA, 2021), an outreach program for individuals with chemsex practices in Madrid, mephedrone was the most concerning drug followed by methamphetamine.

Both methamphetamine and mephedrone are strongly associated with chemsex practices and have high addictive potential. Chronic use of methamphetamine has been linked to health problems such as hypertension, arrhythmias, myocardial infarction, and stroke, among others. Chronic use can lead to anxiety, insomnia, psychotic symptoms, depression, and aggressive behavior (Curto et al., 2020). Additionally, neurotoxicity has been observed with changes in brain structure and impairment of cognitive function. Mephedrone can be responsible for neurological alterations such as seizures and dystonias, as well as cardiologic, hepatic, and renal toxicity (Dolengevich-Segal et al., 2017).

It is important to highlight that the prevalence of drug injection in our sample was twice as high in men reporting sexualized use of methamphetamine or mephedrone compared to the overall sample of chemsex users (28.7% and 27% versus 13.3%). Our findings are consistent with previous research, indicating that these are the most used drugs intravenously in a sexualized context (Guerras et al., 2022b; Ministerio de Sanidad, 2020), a practice associated with a higher risk of overdose or transmission of HIV or Hepatitis C, among other adverse effects (Compton & Jones, 2021).

The results of this study should be interpreted considering several limitations. Firstly, it is a convenience sample based on voluntary participation, which may introduce self-selection bias, and participants in our sample may differ in some characteristics of interest compared to the overall population of GBMSM who engage in chemsex sessions in Spain. Additionally, due to the cross-sectional design of the study, it is not possible to establish causal relationships or the direction of the association between different associated factors. Furthermore, the possible relationship between the study findings and the stigmatization and social isolation of the entire chemsex user population has not been explored.

This study also has several strengths. Firstly, it is one of the recently published studies targeting GBMSM living in Spain that has achieved a larger sample size of chemsex users, allowing for more accurate estimation and analysis of infrequent behaviors. Participants were recruited nationally, including both urban and semi-urban / rural areas, promoting greater geographical variability. Finally, the diversification of channels used



for recruitment favored greater heterogeneity among participants in sociodemographic characteristics, sexual behaviors, and drug use patterns compared to studies based on in-person recruitment procedures in healthcare services or community programs targeting the community.

## CONCLUSION

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To the best of our knowledge, this is the first study that, in addition to estimating the concern about drug use in the overall population of GBMSM engaged in chemsex sessions in Spain, identifies that younger individuals, those who pay for sex, those who use drugs most associated with chemsex, those who inject drugs, and those who report regular drug use are subgroups expressing greater concern. Our study also finds that the drugs most concerning to chemsex users are methamphetamine and mephedrone.

Concern about the negative effects of drug use among chemsex users does not always translate into a demand for attention, but it is a first step in considering the need to contact professionals who can propose the most suitable therapeutic approach for the demands and needs of each user. Therefore, it would be important to promote awareness campaigns and provide information about specialized resources, both in the public healthcare network and in the community, as well as to have tools for early detection of users who could potentially benefit from intervention, considering the available territorial resources.

Likewise, training activities are essential to empower involved professionals so that they can provide appropriate healthcare responses

to the complex phenomenon of chemsex, by acquiring knowledge and developing LGBTI+ cultural competencies that facilitate comprehensive and quality care aligned with the values and needs of each user.

On the other hand, the health inequalities faced by GBMSM engaged in chemsex need future research to study the main barriers hindering their access to available resources when addressing their concern about drug use.

Finally, there is a considerable proportion of chemsex users who do not express concern about their drug use. In this regard, it would be advisable to design health promotion and education campaigns that provide the population with updated information based on available scientific evidence regarding the potential impact of drug use on their physical, mental, sexual, social, and other life spheres, with a special emphasis on raising awareness among those users showing signs of potentially problematic patterns, such as regular and / or injected drug use.

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## Conflict of interest

The authors declare that they have no conflicts of interest.

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