



Psychological characteristics associated with chemsex among men who have sex with men: Internalized homophobia, conscientiousness and serostatus as predictive factors

Benjamín Rodríguez-Expósito^{a,b}, Jennifer A. Rieker^c, Sara Uceda^c, Ana Isabel Beltrán-Velasco^{c,*}, Víctor Echeverry-Alzate^c, Manuel Gómez-Ortega^d, Apoyo Positivo^e, Manuel Reiriz^{c,*}

^a Nebrija University, Facultad de Lenguas y Educación, Universidad Antonio de Nebrija, Madrid 28240, Spain

^b Department of Psychology, UNED, Seville, Spain

^c NBC Group, Psychology Department, School of Life and Nature Sciences, Nebrija University, Madrid, Spain

^d Adhara Asociación VIH/SIDA, Seville, Spain

^e Apoyo Positivo, Madrid, Spain

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ABSTRACT

Background: Although significant progress has been made in the rights of the LGBTQ+ community, even today this population still faces stigma and discrimination that impacts their mental health. In the case of men who have sex with men, it has been demonstrated that the use of drugs in a sexual context (chemsex) is one of the coping mechanisms and means of escape to deal with these situations.

Method: We assessed 284 native Spanish speakers' participants, 45,4 % were not engaged in sexualised drug use ($n = 129$) while 54,6 % were chemsex users ($n = 155$) using 18,7 % of them the injected via. The participants completed six questionnaires about life and sexual satisfaction, depression, anxiety, internalised homophobia and personality. Bivariate and multivariable logistic regression were performed to assess the associations between sexual behaviour-related and psychological variables. Kruskal-Wallis H test was used to analysed the impact on mental health of the administration via.

Results: Aged, unprotected sexual relationships, positive serostatus, homonegativity and conscientiousness predicted the chemsex engagement. Furthermore, we found differences regarding the administration via.

Conclusions: We conclude that mental health significantly correlates with the practice of chemsex, highlighting the importance of integrating mental health considerations into the prevention of risky sexual behaviors.

Introduction

Over recent years, there has been significant progress in enhancing the rights of the lesbian, gay, bisexual, and transgender (LGBT) community through the development of various laws aimed at protecting them against discrimination. Even though this legislative progress appears to be fostering a positive shift in societal attitudes toward the LGBT community (Kantar, 2020; Ruiz-Azcona et al., 2022), the LGBT community is still experiencing social discrimination. For example, in Spain, out of the 1869 hate crimes reported in 2022, incidents motivated by sexual orientation or gender identity ranked as the second most common category, accounting for a total of 459 crimes. This was only

surpassed by crimes related to xenophobia (Ministerio del Interior, 2022).

This high level of stigma or discrimination, faced by individuals can profoundly affect mental health (Batchelder et al., 2017). Focusing specifically on the men who have sex with men (MSM) population, it becomes apparent that this demographic is required to manage complex emotional terrains and cope with both internal and external homophobia, defined as an irrational fear of homosexuals (Blumell & Rodriguez, 2020; Salvati et al., 2019). Additionally, individuals within the MSM community are subjected more frequently to social prejudice. Research in this area showed that, across over 10 European countries, the primary cause of peer teasing among students aged 12 to 18 years is associated

* Corresponding authors.

E-mail addresses: abeltranv@nebrija.es (A.I. Beltrán-Velasco), mreiriz@nebrija.es (M. Reiriz).

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with sexual orientation, accounting for 46 % of the total, which exceeds the prevalence of teasing based on disability, physical appearance or race (Albornoz-Fuentes & Barrientos-Delgado, 2023; Diefendorf & Bridges, 2020; López-Sáez et al., 2020; Rollè et al., 2022). Moreover, it is estimated that at least 9 % of young MSM have attempted suicide before the age of 17, contrasting with the considerably lower incidence of 3,6 % observed within the heterosexual youth population (Nystedt et al., 2019; Pineda-Roa, 2019). Finally, the MSM and the gay population present a higher prevalence of mental health issues, such as mood disorders (especially depression and anxiety) or eating disorders (Chodzen et al., 2020; Hellman, 2022; Yeretziyan et al., 2023). Furthermore, as occurred with other vulnerable populations, these mental health issues were increased during COVID-19 pandemic (Reiriz et al., 2023a).

In conclusion, individuals within the LGBT community are confronted with numerous external and internal stressors that can potentially damage their sense of identity (Jaspal, 2022). This damage to identity can be detrimental to the individuals' psychological well-being, prompting the adoption of different coping strategies. These strategies are not always adaptive, and are influenced by a complex interplay of social, institutional, interpersonal, and psychological factors (Halkitis & Singer, 2018).

The evidence suggests that MSM resort to drug use within sexual contexts (chemsex), as a means to cope with threats to their identity. Indeed, previous observations show that chemsex is used as a form of psychological escapism by the persons who practice it (Weatherburn et al., 2017). For instance, individuals engaging in chemsex reported experiencing dissatisfaction with aspects of gay culture, where phenomena such as heteronormativity, rejection, judgment, and prejudice may exacerbate feelings of threat. These factors appear to be significantly attenuated within the context of chemsex, suggesting that it offers a temporary reprieve from these pressures. Consequently, this reliance on drugs for coping can hinder the development of a positive sexual identity among some MSM (Jaspal, 2022).

Chemsex is defined as the use of certain substances, most commonly methamphetamine, mephedrone, GHB, and ketamine, immediately before or during the sexual intercourse to enhance, prolong, or intensify the experience (Bourne et al., 2015; Edmundson et al., 2018). In Spain, chemsex has more prevalence in tourist regions and big cities such as Madrid or Barcelona (Ministry of Health, 2020). Although individuals from any demographic group may engage in chemsex, it is most commonly associated with single gay men aged between 25 and 45, who are employed and have a higher educational level (McCall et al., 2015). However, the results of the available studies offer diverse results in terms of the type of population engaging in chemsex, not exclusive to MSM. For example, a study conducted by Sewell et al. (2017), showed that HIV-negative men used recreational drugs in a sexual context in the UK. Similarly, almost 2 % of participants were heterosexuals who engaged in chemsex. On the other hand, a longitudinal study published by Hampel et al. (2020) in Switzerland found a large disparity in the trend of recreational drug use between MSM and non-MSM over time. Specifically, this study revealed a shift amount MSM from less harmful drugs such as cannabinoids to a significant increase in the use of methamphetamine and GHB. In addition, a direct relationship between this trend with co-infections and depression was determined.

In MSM sexualized drug use has been related to an increase of sexual pleasure (Graf et al., 2018; Weatherburn et al., 2017), suggesting that it might not be inherently problematic (Stuart, 2016). In this sense, chemsex facilitates a desired sexual experience among MSM by increasing libido, enhancing sexual arousal, easing sexual intercourse, and promoting euphoria, socialization, and confidence among others (Dolengevich-Segal et al., 2017; Weatherburn et al., 2017). In this line, a study conducted by Ahmed in London showed that there is a false perception of the pervasiveness of chemsex in gay culture, associated with unique sexual expectations. This can lead to a false consensus effect, motivating gay men to use drugs in a sexual context. These misbeliefs increase stigma towards gay men and show the need to address

the perceived normalization of chemsex in the gay community (Ahmed et al., 2016).

Chemsex also carries serious health risks. In this sense this practice is associated with unprotected anal intercourse (Drückler et al., 2018; Frankis et al., 2018; Glynn et al., 2018; Kenyon et al., 2018) and leading to increased rates of sexually transmitted infections (STIs) (Pufall et al., 2018; Rosińska et al., 2018). Furthermore, individuals engaging in chemsex are more likely to be HIV positive compared to those who do not participate in this practice (Frankis et al., 2018; Pakianathan et al., 2018; Rosińska et al., 2018). Beyond physical health concerns, chemsex has been associated with other issues, such as legal problems, family conflicts, the risk of overdose, interactions with other treatments, and non-adherence to medical treatments (Tomkins et al., 2019). Psychologically, chemsex is associated with emotional decline, increased substance abuse disorders, and higher rates of anxiety and depression diagnoses (Íncera-Fernández et al., 2021; Tomkins et al., 2019). Particularly concerning is the subgroup engaging in 'slamming,' a practice related to chemsex involving intravenous drug which increase health risks (Ministry of Health, 2020; Trouiller et al., 2020). Although this group appears to be small, it exhibits high rates of HIV and Hepatitis C Virus infections, as well as poor mental health outcomes (Trouiller et al., 2020).

In recent years, a growing body of research has examined the impact of the chemsex on mental health. For example, Evers et al. (2020), found that in a sample of 511 MSM in The Netherlands, 41 % of the participants were classified as chemsex users and 23 % of them reported a need for professional counselling. In the same year, Bohn et al. (2020) found higher levels of anxiety and depression among chemsex users compared to non-chemsex users. Furthermore, a recent systematic review found a relationship between chemsex use and psychosis (Moreno-Gámez et al., 2022).

While the mental health implications of chemsex use have received extensive attention, the influence of other factors such as internalized homophobia or personality traits have received less attention. In this sense, it is known that certain personality factors, such as extraversion, may be linked to a higher likelihood of drug use. Additionally, psychological variables, including impulsivity, guilt, loneliness, and shame emotions, have been associated with drug use and risky sexual behaviour (Livingston, 2017; Puckett et al., 2017). Then, the aim of this study is threefold. Firstly, we will analyze the prevalence and patterns of sexualized drug use within the LGBT community, with a particular focus on the usage of specific drugs in sexual contexts. Secondly, to deepen the understanding of the relationship between chemsex use and mental health issues, we will analyze the impact of personality traits, internalized homophobia, anxiety and depression on chemsex phenomenon, investigating whether these factors could predict future problematic use of chemsex. Finally, the study seeks to analyze the psychological differences among individuals based on their type of engagement in chemsex, distinguishing between those who use drugs through injection, those who use drugs without injection, and those who abstain from chemsex altogether.

With this comprehensive approach we aim to provide insights into the diverse experiences and potential risks associated with chemsex use, thereby enhancing our understanding of its effects on individual psychological health and guiding the development of targeted interventions and support mechanisms.

Methods

Participants

A total of 402 adults belonging to the LGBT community were recruited using nonprobability sampling techniques from January to August 2023. The inclusion criteria were: (i) being of legal age (ii) being homosexual, bisexual or others men who have sex with men (iii) being cisgender man and (iv) being Spanish speaker's residing in Spain. The

final sample size included 284 men. Of them 79.9 % of participants were Spanish citizens, 7 % venezolanos, and 13 % from other Latin-American countries (Argentina, Chile, Colombia, Cuba, Ecuador, Guatemala, Mexico, Peru). The mean age of participants was 36.4 years (range 18–66, SD = 10.1), and most participants (88.7 %) identified as gay, as opposed to bisexual. Regarding the level of educational attainment, 76.1 % had completed tertiary education, 19.7 % upper secondary education, and 4.2 % below upper secondary education. At the moment of data collection, 33.1 % of the participants had been in a stable relationship for at least three months.

Fifty-two men (18.3 %) were HIV positive, and 74 men (26.1 %) were HIV negative consuming pre-exposure prophylaxis (PrEP). Twenty-five percent of the participants reported having been infected with one sexually transmitted infection during the last year, and 9.5 % with two or more. Regarding the specific infections, 15.1 % of the participants reported having been infected with Gonorrhoea, 14.4 % with Chlamydia, and 9.2 % with Syphilis. There were two cases of hepatitis C, and 6.7 % reported other types of infections, such as human papillomavirus or genital herpes.

Regarding the sexual activity, 58.5 % of the participants reported having used only occasionally, almost never, or never a condom in sex with penetration during the last six months, as opposed to those who reported having used protection always or almost always. Of those participants who never or rarely used protection during sex, 41 % informed of having had 11 to 50 sexual partners during the last six months, and 9.6 % of having had 51 or more sexual partners.

The most frequently consumed drugs were popper (81.9 %), mephedrone (62.6 %), and GHB (53.5 %). The remaining drugs were consumed with similar prevalence: methamphetamine (27.1 %), amphetamine (21.3 %), ketamine (26.5 %), cocaine (29.7 %), MDMA (22.6 %), and 2C-B (also known as tusi) (18.1 %). Participants had consumed an average of four different drugs during the last 6 months (mean = 3.71, SD = 2.48, range = 1 – 9), and polydrug consume was frequent: 12.3 % had consumed two different drugs and 18.7 %, three or more drugs. Of those injecting chemsex drugs ($n = 29$), 44.8 % reported injecting drugs almost never or only occasionally, and 55.2 % reported injecting them always or almost always.

Instruments

The online questionnaire was composed of instruments selected based on their psychometric properties, validity and availability of cut-off points. Furthermore, validated Spanish versions of the instruments were used to ensure linguistic and cultural appropriateness. The final questionnaire of this study comprised the following instruments:

Demographic and Background Characteristics: Participants reported demographic characteristics, including age, gender, sexual orientation, education degree, nationality, as well as relevant information about sexual activity, relationship status, and drug consumption patterns.

Satisfaction with Life Scale (SWLS): The SWLS is a five-item self-report scale developed to assess overall satisfaction with life (Diener et al., 1985). The SWLS is rated on a Likert scale from 1 (strongly disagree) to 7 (strongly agree), where higher scores indicate greater life satisfaction. For this study, a validated Spanish version of this instrument (Vázquez et al., 2013) was used. The reliability of the scale scores within our sample showed a high level of internal consistency, with a Cronbach's alpha (α) of 0.90.

New Sexual Satisfaction Scale (NSSS): The NSSS is a twenty-item self-report scale designed to measure sexual satisfaction, covering a broad spectrum of aspects related to sexual satisfaction. It is designed to be inclusive of all genders, sexual orientations, and relationship statuses (Stulhofer et al., 2010). The NSSS is rated on Likert scale from 1 (not at all satisfied) to 5 (extremely satisfied), with participants rating their level of satisfaction with their sex life over the previous six months. Higher scores on the scale indicate greater levels of sexual satisfaction. We used a validated Spanish version of this instrument (Strizzi et al.,

2016). The estimated reliability of the scale scores in our sample was $\alpha = 0.90$.

PHQ-9: The PHQ-9 is a nine-item self-report scale designed to assess the frequency of symptoms of depression in alignment with the criteria set forth in the DSM-5, covering the two weeks prior to assessment (Kroenke et al., 2001). The PHQ-9 is rated on a Likert scale from 0 (not at all) to 3 (nearly every day), with higher scores indicating increased severity of depression symptoms. We used a validated Spanish version of this instrument (Diez-Quevedo et al., 2001). The estimated reliability of the scale scores in our sample was $\alpha = 0.88$.

GAD-7: The GAD-7 is a seven-item self-report scales designed to measure symptoms of generalized anxiety disorder (GAD) as outlined in the DSM-5, focusing on the two weeks preceding the assessment (Spitzer et al., 2006). The GAD-7 is rated on Likert scale from 0 (not at all) to 3 (nearly every day), with higher scores indicating increased severity of anxiety symptoms. We used a validated Spanish version of this instrument (García-Campayo et al., 2010). The estimated reliability of the scale scores in our sample was $\alpha = 0.90$.

NEO-FFI: The NEO-FFI is the reduced version of the NEO Personality Inventory, comprising 60 items designed for the rapid assessment of the five major personality traits: Neuroticism (chronic predisposition to feeling worried and nervous), Extraversion (energetic and enthusiastic), Openness to experience (curiosity and nonconformity), Agreeableness (caring and confident) and Conscientiousness (demanding and thorough) (Costa & McCrae, 1992). The NEO-FFI is rated on Likert scale from 0 (strongly disagree) to 4 (strongly agree). We used a validated Spanish version of this instrument (Costa, 2008). The estimated reliability of the scale scores in our sample was as follows: Neuroticism $\alpha = 0.85$, Extraversion $\alpha = 0.80$, Openness to experience $\alpha = 0.76$, Agreeableness $\alpha = 0.75$ and Conscientiousness $\alpha = 0.87$.

SIHS: The SIHS is a thirteen-item self-report scale designed to measure of internalized homophobia (Currie et al., 2004). The SIHS is rated on Likert scale from 1 (strongly disagree) to 5 (strongly agree). We used a validated Spanish version of this instrument (Morell-Mengual et al., 2017). The estimated reliability of the scale scores in our sample was $\alpha = 0.78$.

Procedure

A cross-sectional study design was used to examine the prevalence and patterns of drug use in sexual context (chemsex/slamming) among participants before the onset of the study. The participants were recruited through the associations for the prevention of HIV infection (Adhara & Apoyo positivo). All participants' answers were collected using the Google Forms web application.

The study was approved by the Ethics Committee of Nebrija University, Spain (code: UNNE-2022-011). All participants signed informed consent forms before data collection began.

Data analysis

Education was classified according to the International Standard Classification of Education (ISCED) (UNESCO, 2012) into the following categories of educational attainment: Below upper secondary education including primary education or lower secondary education; upper secondary level including high-school diploma, and tertiary education, including bachelor's, master's, or doctoral or equivalent levels.

Categorical variables were expressed as frequencies, and continuous variables as mean values. Several univariate logistic regression models were fitted to the data to assess the associations between sexual behavior-related and psychological variables, and the engagement in sexualized drug use. Variables significant at the bivariate level ($p < .05$) were analyzed by multivariable logistic regression with backward elimination of insignificant variables to estimate the adjusted odds ratios (AOR) and 95 % confidence intervals (CI) for reporting chemsex in the last year. Here we define 'chemsex' as reporting having had sex after

taking a chemsex drug (popper, mephedrone, GHB, methamphetamine, amphetamine, ketamine, cocaine, MDMA, or 2C-B) in the last year.

Data were checked for multicollinearity, linearity of the logit, and for model fit. The Box-Tidwell test showed that the continuous variables Openness to Experience and Conscientiousness of the NEO-FFI questionnaire, as well as Age did not fulfill the assumption of the logit (linearity between the categorical outcome and continuous predictors) and were thus categorized into ordinal variables. Age was categorized into five categories (< 24 years; 24 – 35 years; 36 – 45 years; 56 – 55 years; > 55 years). For the sake of parsimony, we transformed all subscales of the NEO-FFI questionnaire into ordinal variables with four categories (low, moderate, high, very high), taking the 25th percentile as the first cut value. No other violations of the assumptions of logistic regression were found.

In a last step, we compared the psychological variables across participants who consumed injected chemsex vs. those who consumed chemsex but not injects, and those who did not consume chemsex. Those variables that did not fulfill the assumptions of normality and/or homogeneity of variance were analyzed using Kruskal-Wallis H test. Variables with significant principal effects were submitted to multiple comparisons using Tukey-Kramer test for unequal sample sizes.

All analyses were conducted using IBM SPSS Statistics v. 29.0.

Results

Bivariable analyses

As compared to individuals younger than 24 years (reference), belonging to the 46-to-55-years age group increased the odds of being engaged in sexualized drug by 9.33 times ($p < .001$) (see Table 1). Belonging to the 36-to-45-years group, or being older than 55 years, increased the odds by 5.35 ($p < .01$) and 5 ($p < .05$) times, respectively. On the other hand, individuals who were HIV positive were 3.9 times more likely to be engaged in sexualized drug use than HIV negative men ($p < .001$). In line with previous literature, we also found statistically significant associations between high-risk sexual behaviors and the use of chemsex: having had 11 to 50 different sexual partners in the last six months was associated with more than a two-fold increase of consuming chemsex ($OR = 2.55; p < .01$), and having had more than 51 partners with ten-more times of belonging to the chemsex group ($OR = 10.11, p < .01$). In the same line, using a condom never, almost never, or only occasionally was associated with 5.8 more odds of consuming chemsex than using a condom always or almost always ($p < .001$).

Regarding the psychological variables, scoring high in openness to experience was associated with a decrease of the odds of consuming chemsex by 47 % ($OR = 0.53, p < .05$), and scoring very high in conscientiousness was associated with a decrease by 70 % ($OR = 0.3, p < .05$).

Satisfaction with Life (SWLS) and Sexual Satisfaction (NSSS) was negatively associated with the engagement in chemsex: an increase by one unit in either of the scales decreased the odds of consuming chemsex by 3 % ($OR = 0.97, p < .05$) and 2 % ($OR = 0.98, p < .01$), respectively. On the other hand, the engagement in sexualized drug use was associated with higher scores of depression and internalized homophobia, and an increase by one unit in the PHQ-9 or in the SIHS questionnaire, increased the odds of consuming chemsex by 1.04 ($p < .05$) and 1.03 ($p < .05$) times, respectively.

Multivariable analysis

A multivariable logistic regression with backward elimination was carried out to assess the effect of variables that were significant at a bivariate level on the likelihood of engaging in sexualized drug use. Due to the strong association between the number of sexual partners and the number of unprotected anal intercourse, we only included the latter in the multivariable analysis, considering it a greater sexual risk factor.

Table 1

Bivariate analyses between demographics, high-risk sexual behaviours, psychological variables, and personality traits, and the engagement in sexualized drug use.

Frequency (%)	Not engaged in sexualised drug use (n = 129)	Engaged in sexualised drug use (n = 155)	OR (95 % CI)
Age group			
<25 (ref.)	20 (15.5 %)	6 (3.9 %)	ref.
25 – 34	60 (46.5 %)	59 (38.1 %)	3.28 (1.23, 8.74)*
35 – 44	33 (25.6 %)	53 (34.2 %)	5.35 (1.95, 14.71)**
45 - 54	10 (7.8 %)	28 (18.1 %)	9.33 (2.92, 29.88)***
55+	6 (4.7 %)	9 (5.8 %)	5.00 (1.26, 19.84)*
Highest educational level achieved:			
Junior high school	7 (5.4 %)	5 (3.2 %)	ref.
Senior high school	23 (17.8 %)	32 (20.8 %)	2.01 (0.57, 7.12)
University or higher	99 (76.7 %)	117 (76.0 %)	1.66 (0.51, 5.38)
Currently in a stable relationship			
No	87 (67.4 %)	52 (33.5 %)	ref.
Yes	42 (32.6 %)	103 (66.5 %)	1.05 (0.64, 1.72)
Sexual orientation			
Bisexual	21 (16.3)	11 (7.1 %)	ref.
Homosexual	108 (83.7 %)	144 (92.9 %)	2.55 (1.18, 5.50)*
Number of sexual partners in the last 6 months			
10 or less	91 (70.5 %)	72 (46.5 %)	ref.
11 to 50	36 (27.9 %)	67 (43.2 %)	2.35 (1.41, 3.92)**
More than 51	2 (1.6 %)	16 (10.3 %)	10.11 (2.25, 45.41)**
Condom use during sexual relations in the past 6 months			
Always or almost always	82 (63.6 %)	36 (23.2 %)	ref.
Never, almost never, or occasionally	47 (36.4 %)	119 (76.8 %)	5.77 (3.44, 9.67)***
HIV Status			
Negative	118 (91.5 %)	114 (73.5 %)	ref.
Positive	11 (8.5 %)	41 (26.5 %)	3.86 (1.89, 1.88)***
Diagnosis of at least two sexually transmitted infections during the last 6 months			
No	91 (70.5 %)	95 (61.3 %)	ref.
Yes	38 (29.5)	60 (38.8 %)	1.51 (0.92, 2.49)
NEO-FFI: Neuroticism			
Low	35 (27.1 %)	39 (25.2 %)	ref.
Moderate	54 (41.9 %)	56 (36.1 %)	0.93 (0.52, 1.68)

(continued on next page)

Table 1 (continued)

Frequency (%)	Not engaged in sexualised drug use (n = 129)	Engaged in sexualised drug use (n = 155)	OR (95 % CI)
High	28 (21.7 %)	38 (24.5 %)	1.22 (0.62, 2.38)
Very high	12 (9.3 %)	22 (14.2 %)	1.65 (0.71, 3.81)
NEO-FFI: Extraversion			
Low	34 (26.4 %)	48 (31.0 %)	ref.
Moderate	46 (35.7 %)	42 (27.1 %)	0.65 (0.35, 1.19)
High	32 (24.8 %)	48 (31.0 %)	1.06 (0.57, 1.99)
Very high	17 (13.2 %)	17 (11.0 %)	0.71 (0.32, 1.58)
NEO-FFI: Openness to experience			
Low	29 (22.5 %)	49 (31.6 %)	ref.
Moderate	43 (33.3 %)	50 (32.3 %)	0.69 (0.37, 1.27)
High	44 (34.1 %)	39 (25.2 %)	0.53 (0.28, 0.99)*
Very high	13 (10.1 %)	17 (11.0 %)	0.77 (0.33, 1.82)
NEO-FFI: Agreeableness			
Low	31 (24.0 %)	43 (27.7 %)	ref.
Moderate	44 (34.1 %)	66 (42.6 %)	1.08 (0.59, 1.97)
High	44 (34.1 %)	32 (20.6 %)	0.52 (0.27, 1.00)
Very high	10 (7.8 %)	14 (9.0 %)	1.01 (0.40, 2.57)
NEO-FFI: Conscientiousness			
Low	28 (21.7 %)	47 (30.3 %)	ref.
Moderate	39 (30.2 %)	56 (36.1 %)	0.62 (0.46, 1.59)
High	44 (34.1 %)	43 (27.7 %)	0.58 (0.31, 1.09)
Very high	18 (14.0 %)	9 (5.8 %)	0.30 (0.12, 0.75)*
SWLS	22.79 (8.18)	20.64 (8.18)	0.97 (0.94, 1.01)*
NSSS	70.27 (15.31)	64.68 (17.42)	0.98 (0.96, 0.99)**
PHQ-9	7.35 (5.97)	9.08 (7.14)	1.04 (1.00, 1.08)*
GAD7	6.16 (5.24)	7.25 (5.76)	1.04 (0.99, 1.08)
SIHS	39.43 (7.04)	41.21 (7.59)	1.03 (1.00, 1.07)*

CI = confidence interval, GAD7 = Generalized Anxiety Disorder Scale, NEO-FFI = NEO Personality Inventory, NSSS = Nueva Escala de Satisfacción Sexual [New Sexual Satisfaction Scale], OR = odds ratio, PHQ-9 = Patient Health Questionnaire, SIHS = Short Internalized Homonegativity Scale, SWLS = Satisfaction with Life Scale.

* < 0.05; ** < 0.01; *** < 0.001.

The final model was statistically significant when compared to the null model ($\chi^2(10) = 80.685, p < .001$). Five factors were extracted, that explained 36 % of the variation of engaging versus not in sexualized drug use (Nagelkerke R^2) and which correctly predicted 76.1 % of cases (see Table 2). Factors significantly associated with the engagement in sexualized drug use were: (1) being aged 24 years and over, with increasing odds as a function of increasing age, (2) having a greater number of unprotected sexual relationships, (3) being HIV positive, and (4) scoring high on the Short Internalized Homonegativity Scale. (5) A very high score in Conscientiousness was associated with less likelihood of engagement in sexualized drug use, and thus this personality trait might constitute a protective factor for chemsex use.

Type of drug consumption, psychological well-being, and personality traits

Overall, we found significant differences across groups in Sexual Satisfaction ($F = 9.452, p < 0.001, \eta^2 = 0.063$), and pairwise comparisons showed that injected chemsex was associated with significantly lower sexual satisfaction when compared with not-injected chemsex (mean difference = -10.857, $p = 0.004$) and with no chemsex consumption (mean difference = -14.409, $p < 0.001$). Also Internalized Homonegativity differed across groups ($F = 4.015, p = 0.019, \eta^2 = 0.028$), and slamming was related to significantly higher Homonegativity when compared to those who did not consume chemsex (mean difference = 4.187, $p = 0.016$), whereas the difference in those

Table 2

Multivariable logistic regression analysis with engagement in sexualized drug use explained by condom use, HIV status, age group, internalized homophobia, and the personality trait conscientiousness.

	Beta	Wald χ^2	d. f.	P	OR	95 % CI
Condom use during sexual relations in the past 6 months						
Always or almost always (ref.)						
Never, almost never, or occasionally	1.77	34.11	1	< 0.001	5.88	3.24 – 10.65
HIV Status						
Negative (ref.)						
Positive	0.89	4.82	1	0.028	2.44	1.10 – 5.42
Age group						
<25 (ref.)						
25 – 34	1.14	4.62	1	0.032	3.12	1.11 – 8.78
35 – 44	1.39	6.52	1	0.011	4.00	1.38 – 11.57
45 – 54	1.53	5.83	1	0.016	4.61	1.33 – 15.91
55+	0.84	1.16	1	0.281	2.32	0.50 – 10.68
SIHS	0.60	9.65	1	0.002	1.06	1.02 – 1.10
NEO-FFI: Conscientiousness						
Low (ref.)						
Moderate	0.13	0.13	1	0.717	1.14	0.55 – 2.36
High	-0.33	0.77	1	0.381	0.72	0.35 – 1.50
Very high	-1.11	4.12	1	0.042	0.33	0.11 – 0.96

Nagelkerke $R^2 = 0.36$.

Note: The following predictors did not reach statistical significance in the adjusted model and were eliminated: SWLS, NSS, Openness to experience. AOR = adjusted odds ratio, CI = confidence interval, d.f. = degree of freedom, NEO-FFI = NEO Personality Inventory, SIHS = Short Internalized Homonegativity Scal.

who consumed not-injected chemsex did not reach statistical significance (mean difference = 2.97, n.s.). Satisfaction with Life declined across groups, being highest in those who did not consume chemsex and lowest in those who injected drugs ($\chi^2 = 18.769, p < 0.001$), and Anxiety increased as a function of drug consumption, being highest in the drug-injecting group ($\chi^2 = 6.516, p = 0.038$). Regarding the personality traits, Neuroticism ($F = 4.491, p = 0.012, \eta^2 = 0.031$) and Conscientiousness differed across groups ($F = 4.796, p = 0.024, \eta^2 = 0.026$). Pairwise comparisons showed that those who injected drugs exhibited more Neuroticism than those who did not inject drugs (mean difference = 5.33, $p = 0.027$) and those who did not consume any sexualized drugs (mean difference = 6.11, $p = 0.009$). Compared to not consuming any drug, injected drugs were also related to lower Conscientiousness (mean difference = -3.818, $p = 0.042$), whereas no difference was found when compared to not-injected chemsex consumption (mean difference = -1.927, n.s.) (Table 3).

Discussion

The aim of this study was to analyse the relationship between internalized homophobia, personality traits, anxiety and depression, on sexualized drug use patterns, and their potential to predict future problematic chemsex use in MSM. Furthermore, this study explored psychological differences among individuals based on their mode of chemsex participation—whether through injection, non-injection, or abstinence.

The decision to choose MSM population group for this study was

based on existing research indicating a higher prevalence of drug use among MSM compared to non-MSM (Berg et al., 2020; Hunter et al., 2014; Samra et al., 2017). Out of the total recruited sample ($n = 402$), 284 individuals (71 %) identified as MSM and of these, 155 (38 %) reported having been engaged in chemsex in the past six months. This rate exceeds the prevalence observed in other studies conducted with clinical samples focused on sexually transmitted infections (10,3–35 %) (Drückler et al., 2018; Ivey et al., 2023), and is significantly higher than findings from internet-recruited MSM samples, where the prevalence is noted to be between 5 % to 10,3 % (Ivey et al., 2023). Additionally, 18,7 % of the chemsex users reported using drugs via injection, exceeding the prevalence documented in previous studies (14,9 %) (Bowden-Jones et al., 2017). These results suggest that internet recruitment might capture a broader and more heterogeneous population. In the same line, recruitment carried out in specialized centers (STI Clinics) tend to be more targeted, offering greater access to the target population, thereby explaining the higher prevalence of chemsex practices observed in this study.

The bivariate analysis revealed that several factors, including age, depression, internalized homophobia, sexual and life satisfaction, the number of sexual partners, less condom use, being HIV positive, moderate openness to experience, and low conscientiousness are associated with chemsex engagement. Individuals engaging in chemsex were more likely to report a higher number of sexual partners. Additionally, data showed a significant association between chemsex engagement and more frequent unprotected sex, highlighted by a clear contrast between those who always or almost always use condoms and those who never,

Table 3

Comparison of demographics, high-risk sexual behaviours, and psychological variables for individuals who injected chemsex drugs, individuals who consumed not-injected chemsex, and individuals who did not consume chemsex. Mean values with standard deviation or frequency with percentage in parentheses.

	Not engaged in sexualised drug use (n = 129)	Not injected sexualised drug use (n = 126)	Injected sexualised drug use (n = 29)	F/ χ^2	p
Age group					
<24	22 (17.1 %)	8 (6.3 %)	0 (0 %)		
24 - 35	58 (45%)	48 (38.1 %)	9 (31 %)		
36 - 45	33 (25.6 %)	40 (31.7 %)	13 (44.8 %)		
46 - 55	10 (7.8 %)	22 (17.5 %)	6 (20.7 %)		
55+	6 (7.8 %)	8 (6.3 %)	1 (3.4 %)	21.172	< 0.001
Highest educational level achieved:					
Junior high school	7 (5.4 %)	4 (3.2 %)	1 (3.4 %)		
Senior high school	23 (17.8 %)	27 (21.4 %)	6 (20.7 %)		
University or higher	99 (76.7 %)	95 (75.4 %)	22 (75.9 %)	1.261	.868
Number of sexual partners in the last 6 months					
10 or less	91 (70.5 %)	57 (45.2 %)	15 (51.7 %)		
11 to 50	36 (27.9 %)	58 (46.0 %)	9 (31.0 %)		
More than 51	2 (1.6 %)	11 (8.7 %)	5 (17.2 %)	24.552	<0.001
Condom use during sexual relations in the past 6 months					
Always or almost always	82 (863.6 %)	32 (25.4 %)	4 (13.8 %)		
Never, almost never, or occasionally	47 (36.4 %)	94 (74.6 %)	25 (86.2 %)	48.483	<0.001
HIV Status					
Negative	118 (91.5 %)	103 (81.7 %)	11 (37.9 %)		
Positive	11 (8.5 %)	23 (18.3)	18 (62.1 %)	45.38	<0.001
Diagnosis of at least two sexually transmitted infections during the last 6 months					
No	91 (70.5 %)	78 (61.9 %)	17 (58.6 %)		
Yes	38 (29.5 %)	48 (38.1 %)	12 (41.4 %)	2.779	.249
SWLS	22.79 (7.64)	21.82 (7.95)	15.52 (7.27)	18.769	<0.001
NSSS	70.27 (15.31)	66.71 (16.68)	55.86 (18.09)	9.452	<0.001
PHQ-9	7.35 (5.97)	8.57 (6.73)	11.31 (8.49)	5.697	.058
GAD7	6.16 (5.24)	6.82 (5.63)	9.14 (6.08)	6.516	.038
SIHS	39.43 (7.04)	40.65 (7.84)	43.62 (5.90)	4.015	.019
NEO-FFI: Neuroticism	33.44 (10.01)	34.22 (9.84)	39.55 (10.36)	4.491	.012
NEO-FFI: Extraversion	41.96 (8.91)	42.03 (9.05)	40.45 (7.08)	.404	.668
NEO-FFI: Openness to experience	43.93 (6.22)	43.12 (7.77)	41.24 (6.03)	4.904	.086
NEO-FFI: Agreeableness	41.49 (6.45)	41.14 (6.99)	39.07 (6.19)	1.565	.211
NEO-FFI: Conscientiousness	42.54 (8.35)	40.65 (7.13)	38.72 (6.46)	3.796	.024

GAD7 = Generalized Anxiety Disorder Scale, NEO-FFI = NEO Personality Inventory, NSSS = New Sexual Satisfaction Scale, PHQ-9 = Patient Health Questionnaire, SIHS = Short Internalized Homonegativity Scale, SWLS= Satisfaction with Life Scale.

almost never, or only occasionally use them. Participants engaging in chemsex were also more likely to be HIV positive, indicating a potentially higher prevalence of HIV within networks associated with chemsex activities. This trend is notably more pronounced among participants who practice slamming (injected drug use). In this subgroup, almost 90 % reported never, almost never, or only occasionally using condoms during sexual encounters. Furthermore, 17 % of this group reported having more than 51 sexual partners in the past six months, a significant increase compared to the 1.6 % among those not engaged in sexualized drug use. Nearly two-thirds (62,1 %) of this group were HIV positive, suggesting a possible bidirectional relationship where individuals with HIV may be more inclined to engage in this form of chemsex, potentially due to social and psychological factors.

Following multivariable logistic regression analysis, only low condom use, HIV positive status, age, internalized homophobia and conscientiousness remained as significant predictors for chemsex engagement, whereas sexual satisfaction ceased to be a significant predictor. This suggests that the influence of sexual satisfaction on chemsex behavior is mitigated when adjusting for the effect of the other predictor variables. The multiple regression indicated that the practice of unprotected sex increased the chance of consuming chemsex by six, and being and HIV-positive doubled the chance of sexualized drug use, emphasizing the strong relationship between sexual high-risk behaviour and chemsex consumption. These results are in line with previous research that reported an association between condom use and chemsex, indicating that the decision of using a condom is modulated by various factors, such as drug use, more physically traumatic sexual relations, and high-risk practices (Bourme et al., 2015; Ivey et al., 2023; Reiriz et al., 2023b). The reduction in condom use might be explained by the fact that substance consumption often enhances sexual functioning, increases sexual disinhibition, and alters decision-making processes, favouring high-risk behaviors and increasing the likelihood of HIV and STIs transmissions. In this sense, our results reveal an increased prevalence of STIs across chemsex consumers versus non consumers, although in our study this result was not significant.

On the other hand, the relationship we observed between chemsex engagement and HIV-positive status corroborates findings from previous research indicating that drug use within sexual contexts is a predictor of being HIV positive (Bowden-Jones et al., 2017). This same study also found a relationship between methamphetamine consumption and the progression of HIV, attributing this to the drug's influence on cellular responses. Other studies have confirmed the intricate relationship between HIV-positive status and chemsex involvement, including its implications for treatment adherence, and HIV transmission prevention (Peyriere et al., 2023; Strong et al., 2022).

Previous research has found that single men aged between 36 and 45, with low use of condom and being HIV, were more likely to engage in chemsex (Frankis et al., 2018). In our study, participants who engaged in chemsex tended to be older, which is consistent with the findings of Bui et al. (2018), who reported that individuals aged 31–50 years were more likely to engage in recent injection drug use compared to those under 30 years old. Similarly, Khaw et al. (2021) observed that older men, specifically those aged 46–55 and older, reported more frequent involvement in chemsex, although the statistical significance of these differences was not conclusive. Conversely, other research, such as that conducted by Rosińska et al. (2018), identified a higher prevalence of chemsex among younger age groups. The apparent discrepancies between these findings could be attributed to methodological differences across studies, particularly in terms of recruitment strategies and sample characteristics. For instance, our participants were recruited from centers frequented by individuals seeking assistance for drug-related issues, which might have influenced the observed age distribution and heightened the reported prevalence of chemsex in our sample. Additionally, variations in geographic and cultural contexts, which can influence social and behavioural norms related to drug use and sexual practices, might also account for these differences. The link between

older age and chemsex use could also be bidirectional, where the involvement in chemsex by older adults may relate to societal values that link self-worth to sexual attractiveness. Qualitative research indicates that as individuals in the gay community age, they often feel less sexually desirable (Evans, 2019; Tan et al., 2021). Therefore, chemsex among older adults may not only be a pursuit for enhanced sexual experiences but also a manifestation of low self-esteem and feelings of being disregarded. On the other hand, Khaw et al. (2021) suggested that as men age, their social networks and desire for adventure may expand, potentially increasing their exposure to risk factors.

A pivotal finding of our study is the relationship observed between internalized homophobia and chemsex, indicating that experiences of verbal harassment or discrimination, often encountered by MSM, may drive this group towards using chemsex as a maladaptive coping mechanism to deal with depression, anxiety or internalized homophobia (Hegazi et al., 2017; Lafortune et al., 2021). This suggests that chemsex might serve not just as a pursuit for pleasure but as an escape from the negative self-perception and societal judgment associated with their sexual orientation. However, these findings do not align with those of other recent studies (Amundsen et al., 2022; Uholjeva & Pitoňák, 2022), which found no significant differences in levels of internalized homonegativity among their subjects. This discrepancy in findings might be attributed to methodological differences, variations in cultural contexts, or the evolving dynamics of societal attitudes towards the LGBT community. These factors could influence the degree to which internalized homophobia impacts individuals' behaviors and choices regarding chemsex. The contrasting results across studies highlight the complexity of the relationship between internalized homophobia and chemsex, emphasizing the need for further investigation.

In examining the role of personality traits in relation to chemsex, our analysis revealed that individuals who engage in injected drug use scored significantly lower in the conscientiousness domain of the NEO-FFI compared to their non-injecting counterparts. This distinction aligns with the inherent characteristics of the conscientiousness trait, where typical higher scorers exhibit organization, motivation, and goal-directed behaviour, underscoring a sense of responsibility (Korner et al., 2015). Conversely, those with lower scores in conscientiousness, particularly among the injecting drug use group, display more impulsive consumption behaviors and an increased risk-taking propensity associated with the decision to use drugs. This tendency towards impulsivity and risk-taking is further linked to addiction vulnerabilities (Crankshaw et al., 2012; Nowosielski et al., 2021; Pinto et al., 2013).

Furthermore, our findings indicate that higher levels of conscientiousness are inversely associated with the overall likelihood of engaging in chemsex. This suggests that the disciplined and goal-oriented nature attributed to higher conscientiousness may serve as a protective factor against the attraction of chemsex and, by extension, riskier consumption methods like injection. Contrary to expectations, injected drug use was associated not with higher, but with lower levels of sexual satisfaction, alongside elevated scores in neuroticism and anxiety. This counterintuitive finding suggests that the immediate gratification individuals seek through chemsex, particularly via injection, does not lead to enhanced sexual satisfaction and might actually diminish it. The explanation for this phenomenon could be related to the complex psychological landscape of those with higher neuroticism. Individuals with high neuroticism are characterized by emotional sensitivity and a propensity towards negative emotional states, which can magnify feelings of dissatisfaction and disconnection during and after chemsex engagement. Therefore, while the pursuit of chemsex might be motivated by a desire to escape negative feelings or to intensify sexual experiences, the reality for those with heightened neuroticism and anxiety could be that such encounters often fall short of expectations, exacerbating feelings of dissatisfaction and contributing to a lower overall sense of well-being. In this line, individuals who engaged in drug injection reported significantly lower life satisfaction compared to those who did not use drugs via injection and those who abstained from drug

use altogether, with the latter groups displaying similar scores on this measure. This observation raises the critical question of whether the lower life satisfaction observed in drug injectors is a pre-existing condition that predisposes these individuals to engage in more risky forms of drug use, or if it emerges as a consequence of their drug use habits. It seems likely that a combination of initial dissatisfaction and the adverse experiences linked to chemsex, particularly when involving injection, both influence and exacerbate this diminished life satisfaction. This could suggest a cyclical relationship where negative emotional states both drive and are exacerbated by high-risk drug-related behaviors, underscoring the need for interventions that address both mental health and substance use in combination.

Clinical implications

In terms of clinical implications, our findings support the idea that the engagement in chemsex is influenced by a variety of variables, including mental health issues, internalized homophobia, and specific personality traits. These findings are essential for a comprehensive understanding of the chemsex phenomenon and its complex interactions with important factors such as psychological well-being, attitudes towards one's sexuality, and the characteristics inherent to an individual's personality.

Specialized centers where MSM usually attend, such as STIs centers or LGBT associations (Stuart et al., 2015) could offer psychological support services to those experiencing high levels of internalized homophobia. Such support could mitigate the risk of engaging in chemsex and improve overall mental health. In this sense, a previous study indicates that one in every four chemsex users reported that this practice had a negative impact on their lives and almost one third reported that they would like to receive specialized support (Glynn et al., 2018). Using other centers, such as drug addiction centers, may not always be effective, especially when staff lack cultural competence regarding LGBT issues (Evers et al., 2020; Glynn et al., 2018; Ministry of Health, 2020). In fact, chemsex users often perceive themselves as very different from other drug users (such as opiate and crack consumers) who typically use these types of centers (Richard, 2014).

Different possible interventions could be implemented to prevent engagement in chemsex or to reduce potential risks once chemsex has been initiated. Among them, we can highlight group therapies, peer interventions, involving family and friends in care, or online therapies. These interventions could foster social support, increase self-esteem, and ultimately serve as preventive and harm reduction tools for MSM and chemsex users (Ministry of Health, 2020). Moreover, as previously mentioned, chemsex often serves as a coping strategy against stress. Therefore, a comprehensive approach to addressing these stressors could serve as a preventive or harm reduction strategy for chemsex users.

Another important point of intervention is the detection of HIV infection. Our results demonstrate that HIV-positive MSM are at a higher risk of engaging in chemsex, with this factor being the primary predictive indicator. Addressing coping strategies for the infection and serophobia from the time of diagnosis can have a profoundly positive impact on the patient's mental health and decrease the likelihood of initiating chemsex.

Finally, assessing mental health, personality traits, and levels of internalized homophobia in MSM users could help to prevent the initiation of chemsex. This approach allows prevention centers to address the situation from a preventive perspective improving the identification of risk scenarios and personal vulnerabilities, offering alternatives to sexualized leisure activities, and by promoting the development of skills to counteract the normalization of drug use and peer pressure to engage in such behaviors.

Conclusion

This study concludes that mental health significantly correlates with

the practice of chemsex, highlighting the importance of integrating mental health considerations into the prevention of risky sexual behaviors. Addressing mental health provides a viable preventive and therapeutic approach that is both accessible and capable of benefiting individuals beyond their psychological well-being, extending to overall general health improvement. By prioritizing mental health interventions as part of comprehensive risk reduction strategies, there is potential to produce positive change in both the mental and physical health domains of individuals engaged in chemsex, underscoring the interactions between mental health and safe sexual practices.

Limitations and future line research

It is important to note that the methodology of this research may present some limitations in terms of obtaining causal conclusions. While our results highlight several variables influencing chemsex engagement, it is possible that other unexamined factors mediate this relationship in the explanation why this population engages in risky behaviors in a sexual context. Hence, it is likely that additional factors to those analyzed contribute to the decision-making processes surrounding chemsex practices.

Another limitation of this study is the non-probabilistic recruitment method. As detailed in the methodology, this process was carried out through two specialized centers (Associations for the prevention of HIV infection), which could compromise the heterogeneity of the sample. Nevertheless, the data collected are a good indicator of the population studied, although it is necessary to carry out studies that can broaden the heterogeneity of the sample.

Author contribution

M.R., B.R.E. and S.U. conceived the presented idea. A.B. and V.E.A. developed the theory, J.A.R. verified the analytical methods, A.B and V. E.A. supervised the findings of this work. A.P. and M.G.O. participation in sample collection. All authors discussed the results and contributed to the final manuscript redaction.

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The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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