Attachment and Mental Health of Men Having Sex with Men Engaging in Chemsex: Is Substance Abuse Only the Tip of the Iceberg?

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Abstract

Gay and bisexual men and other men who have sex with men (GBMSM) with problematic chemsex (a specific sexualized drug use pattern) face several health issues. The aim of this monocentric observational study was to assess mental health history and attachment style (AS) within 71 GBMSM seeking care for problematic chemsex. Attachment style (AS) was evaluated using the Relationship Scales Questionnaire. 82% of the cohort (58) had at least one mental health disorder (among depression, anxiety, alcohol use disorder or hypersexuality). 9.9% were admitted to intensive care due to chemsex use. Traumas were frequent, with 31% reporting childhood sex abuse and 24% declaring having attempted suicide. 62 (87%) had insecure AS: 38% preoccupied, 23% fearful and 24% dismissing. Users with a positive self model (N=24) had fewer comorbidities (63% vs 92%, p=0.003) and practiced more chemsex alone (75% vs 33%, p<0.001) than users with negative self model (N=47) . Users with a positive other model (N=35) practiced more slamsex (injections of substance in a sexual context) (80% vs 50%, p=0.008) and had fewer comorbidities (71% vs 92%, p=0.027) than users with negative other model (N=36). Attachment theory is a way to provide holistic and tailored and harm reduction.

Key Words: chemsex, men who have sex with men, mental health, addiction, attachment

Introduction

Chemsex (contraction of "chemical sex") is commonly understood as the use of specific drugs, specifically for sex, to reduce inhibition and enhance sexual pleasure, by gay and other men who have sex with men (GBMSM) (Amundsen et al., 2023; Sewell et al., 2019; Stuart, 2019). Specifics substances used are cathinone, methamphetamine, mephedrone, γ-hydroxybutyric acid/γ-butyrolactone (GHB/GBL), cocaine and ketamine (Batisse et al., 2016; Nimbi et al., 2020). In 75% of chemsex acts, some combination of these drugs is used (Batisse et al., 2016; Schreck et al., 2020). "*Slamming*" or "*slamsex*" defines substance injections in a sexual context (Blomquist et al., 2020; Bourne et al., 2015). Few studies evaluate the prevalence of chemsex use outside a clinical population. Of a sample of 30294 GBMSM in the United States, 10% reported chemsex drug use in the past 12 months (Ivey et al., 2023). Edmundson *et al.* report in a literature review in the United Kingdom that 17% of GBMSM attending sexual health clinics and 31% of HIV-positive GBMSM inpatients practice chemsex (Edmundson et al., 2018). Of 1589 HIV-positive GBMSM in the Chems4EU study, which covered GBMSM from four European countries, 24.0% reported practicing chemsex and 6.5% reported practicing slamsex in the previous 12 months (Whitlock et al., 2021). Motivations for engagement in chemsex include emotional connection, bodily sensations, disinhibition, and desire. Substances induce an increase in libido, confidence, disinhibition, and stamina (Diestelmann et al., 2018; Moyle et al., 2020). Clinical experience and gender studies report that for some GBMSM, chemsex causes an experience of sense of collectivity and therefore the rise of chemsex can be linked to an embodied response to material conditions shaped by neoliberalism and feelings of loneliness (Hakim, 2019). Tan et al. described how some GBMSM used chemsex as a coping mechanism to deal with emotional and situational triggers, such as HIV-related stigma, racism, sexual violence, death and loss, neglect, and internalized homophobia (Tan et al., 2021).

Chemsex is associated with severe hazards for health. Cardiac toxicity, bladder or thermoregulation dysfunction are frequently described (Donnadieu-Rigole et al., 2020). Misuse of

GHB can result in severe overdose with unconsciousness among 25% of users or even death (Mason & Kerns, 2002; Weatherburn et al., 2017). Chemsex is associated with a high risk of sexually transmitted infections (STI) such as HIV, hepatitis C, hepatitis B, syphilis, both because of drug use patterns and associated sexual behaviors (such as unprotected anal intercourse or group sex) (Rana et al., 2019). Slamsex brings additional risks of HIV and Hepatitis C infection if needles or other injecting equipment are shared. Acute psychiatric consequences are frequent: panic attacks, psychotic symptoms, suicidal thoughts, severe agitation requiring hospitalization (Batisse et al., 2016; Diestelmann et al., 2018; McKetin et al., 2013). Not all GBMSM who engage in chemsex experience psychiatric symptoms; however, a relationship between drug use and mental health may exist in various studies. Íncera-Fernández et al. showed in a systematic review that 75% of the studies analyzed indicated a relationship between chemsex and negative mental health outcomes, 50% found a positive association between chemsex and depression symptoms, 33% between chemsex and anxiety symptoms and 25% between practicing chemsex and suicidal ideation (Íncera-Fernández et al., 2021). Dual diagnosis, as the co-occurrence of a substance use disorder (SUD) and a psychiatric disorder, is frequent with GBMSM who report problematic chemsex. Psychiatric comorbidities are therefore common: depression (up to 50% of chemsex users, 9.6% report a suicide attempt in their lifetime (Bohn et al., 2020; Hampel et al., 2020)), anxiety disorder (Prestage et al., 2018), alcohol use disorder (AUD) (up to 16% are high-risk drinkers (Lea et al., 2015)) and opioid use disorder(Paschen-Wolff et al., 2022). The role of hypersexuality is unclear (Malandain, Blanc, Ferreri, & Thibaut, 2020; Miner et al., 2016). Prior mental health vulnerabilities of problematic chemsex users have been less studied to date (Bohn et al., 2020; Íncera-Fernández et al., 2021). It would be crucial to determine if the mental health outcomes are present before engaging in chemsex, and which factors are related to its genesis and maintenance. Sexual minorities (people with a homosexual or bisexual sexual orientation) experience worse mental health outcomes compared to the heterosexual population (Burton et al., 2013). This has been associated with formal factors (such as legal sanctions) or informal factors

(such as victimization). Young people experiencing victimization report higher levels of depression, suicidal ideation, suicide attempts, substance use, and absenteeism (Poteat et al., 2011; Russell & Fish, 2016). Minority stress theory (Meyer, 2003) provides a framework for understanding psychological outcomes among sexual minorities. This theory states that sexual minorities are chronically exposed to different stressors such as harassment and victimization, rejection expectations, escape and hiding, prejudices, and the risk of suffering violence simply because they are a sexual minority (Katz-Wise & Hyde, 2012; McConnell et al., 2018). These pressures could affect the mental health and wellbeing of GBMSM and could be exacerbated by reduced social support (Sattler et al., 2017). Potential mental health symptoms among people who use drugs for sexual purposes could be associated with increased vulnerability to sexually transmitted infections (STIs) and a possible reduction in the effectiveness of prevention efforts prior to HIV infections (Sun et al., 2020). Mental health symptoms among GBMSM with problematic chemsex use may therefore be due to several reasons, including prejudice, discrimination, and social stigma as a source of long-term stress (Hylton et al., 2017; Mays & Cochran, 2001; Meyer, 2003; Teasdale & Bradley-Engen, 2010). Interpersonal relationships play a key role in chemsex engagement (Sousa et al., 2020; Strathearn et al., 2019), and could have been altered since the advent of dating apps, used by most chemsex users looking for partners (Choi et al., 2020; Grov et al., 2014). The influence of attachment in the mechanism of addiction is well described (Hiebler-Ragger & Unterrainer, 2019; Strathearn et al., 2019). Attachment theory, initially proposed by Bowlby (1969), posits that early caregiving relationships establish internal working models and subsequent relationships with others. As children grow, they internalize their interactions with caregivers, leading to the development of internal working models that shape their adult relationships (Bowlby, 2005; Fairbairn et al., 2018). Secure attachments in a child's development have been associated with the capacity to autonomously regulate emotions and to establish stable relationships in adulthood. Additionally, in the presence of healthy attachments with caregivers, children acquire the ability to mentalize, enabling them to

comprehend their own and others' emotional states and regulate them through self-reflection (Fonagy & Luyten, 2018). This mentalization ability involves understanding oneself and others in terms of thoughts, feelings, wishes, and desires. Attachment is a dynamic concept, subject to change over time. Research on relationship formations among sexual minorities individuals indicates that self-acceptance, influenced by interactions with family and peers, significantly impacts attachment styles and development, potentially leading to elevated levels of shame and internalized homophobia (Cartner, 2022). Sexual minority youth report a less secure AS with their mothers; their mothers report less affection for them compared to heterosexual peers and siblings(Rosario et al., 2014). A secure AS has been shown to be a protective factor against drug addiction, and insecure AS a risk factor (Fairbairn et al., 2018; Schindler, 2019), especially among sexual minorities (Rosario et al., 2014). Insecure AS had been associated with more high-risk sexual behavior by GBMSM (Starks et al., 2017). Therefore, engaging in poly-drug use with unsafe sexual practices (i.e., Chemsex) may also serve as a means of developing attachment bonds and belonging to a community (Cartner, 2022). Attachment theory could help to understand preconditions associated with the development of problematic chemsex use (Borhani, 2013). Little clinical data is available onAS of GBMSM with chemsex use: González-Baeza A et al. demonstrate that individuals regularly practicing chemsex frequently exhibited an avoidant-insecure attachment style and early adverse life events compared to the control group (González-Baeza et al., 2023).

Currently, care for people who report problematic chemsex is mostly based on prevention and harm reduction (Bourne et al., 2018; Herrijgers et al., 2020; Malandain & Thibaut, 2023) and treatment guidelines are not yet available. The literature reports a scarcity of data concerning the history and current mental health status of GBMSM with problematic chemsex use, as well as the factors contributing to their vulnerabilities and potential intervention strategies.

The aim of this study was to assess the AS, mental health history, and psychiatric comorbidities within a population of GBMSM seeking care for problematic chemsex, and their consequence on the severity of the chemsex practice.

Methods

- ***Participants***

We assessed an exhaustive cohort of 71 GBMSM over the age of 18, who report problematic chemsex and self-referred to the substance use service in the Saint-Antoine Hospital in Paris, France, between January 2018 and April 2022. All information was self-reported by patients in routine care and anonymized. Since the enactment of the "Jardé" Law (n° 2012-300 of March 5, 2012, relating to research involving the human person), there isno need for an ethics committee in a non-interventional study of routine care. All the patients gave written consent and none of them refused to participate in the study. We only used medical data available in their electronic health record for research (AP-HP Health Data Warehouse (EDS)).

- ***Assessments and evaluation tools***

Retrieved data included socio-demographic information, physical and mental health history, description of the chemsex practice and related complications (Table 1). A set of four validated scales were performed evaluating psychiatric symptoms and attachment styles.

Psychometric assessment of comorbidities

Hospital Anxiety and Depression (Bjelland et al., 2002; Snaith, 2003; Zigmond & Snaith, 1983) (HAD) scale, Alcohol Use Disorder Identification Test (AUDIT) (Saunders, Aasland, Amundsen, et al., 1993; Saunders, Aasland, Babor, et al., 1993) and Sexual Addiction Screening Test (SAST)(Carnes, 1991; Montgomery-Graham, 2017), all commonly used validated scales in french

(Bocéréan & Dupret, 2014; Gache et al., 2005; Hegbe et al., 2020) and self-report scales were given. These scales are frequently used to detect psychiatric disorders.

Relationship Scales Questionnaire (RSQ)

The RSQ is a self-report questionnaire of 30 items drawn up from the Relationship Questionnaire of Bartholomew and of the Adult Attachment Scale by Collins and Read (Bowlby, 2005; Collins & Read, 1990). The scores are calculated to define 4 AS: secure, fearful, preoccupied, dismissing (Bartholomew & Horowitz, 1991; Griffin & Bartholomew, 1994) . We calculated the weighted average of the scores for each attachment dimension and thus determined the patient's predominant attachment style. The score for each AS is assessed on a scale of 0 and 5 and the principal AS for each patient is the one with the highest score. The RSQ can also serve as an assessment tool for self model (SM), representing an individual's self-perceived sense of deserving care, and other model (OM), corresponding to an individual's perception of others as reliable and caring providers. These variables are interrelated following Bartholomew et Horowitz theory (Bartholomew & Horowitz, 1991; Genet & Wallon, 2019) :

- Secure individuals show positive SM and OM, which build self-esteem.
- Fearful individuals show negative SM and OM; they fear both intimacy and loneliness and are hyper-reactive to stress.
- Dismissing individuals show positive SM and negative OM; they learn to turn away from their emotional experience in favor of their professional life and social integration, as a result they place a high value on independence.
- Preoccupied individuals show negative SM and positive OM, which leads to low self-esteem, doubts, difficulty coping with life's challenges and vagaries, idealization of others.

The RSQ is approved in French (Guédeney et al., 2010) and is currently used to evaluate substance users (Borhani, 2013; Fairbairn et al., 2018; Gidhagen et al., 2018).

- ***Statistics***

Descriptive statistics include usual parameters: mean ± standard deviation (SD) or number of subjects and percentages. Data analysis was performed by univariate analysis using ANOVA analysis of variance with Jamovi software (version 2.2.5, https://www.jamovi.org). $\chi 2$ tests were performed for nominal variables and independent samples T-Test for continuous variables.

Results

- ***Epidemiology (Table 1)***

Demographic characteristics

71 patients were included. The age of the respondents ranged from 22 to 61 years (mean = 40 years, SD 9.3). All of our respondents were cisgender men, 67 (94%) of them identified as homosexual, the others as bisexual. 28 (39%) were in a relationship. The majority of respondents were employed (N=63 (89%)) and had obtained at least an undergraduate degree (N=51 (72%)).

Physical and mental health history

36 (51%) patients reported being HIV positive, 92% of them (N=33) having an undetectable viral charge. 29 (25%) patients were under PrEP.

48 (67%) reported having seen a clinical psychiatrist and 53 (75%) having seen a psychologist before inclusion in the study. 22 (31%) had already been hospitalized in a psychiatric ward, and 36 (51%) had already taken an antidepressant medication. 17 (24%) had attempted suicide. 8 (11%) had seen a pedopsychiatrist in their lifetime**.** 22 (31%) reported childhood sex abuse.

Psychiatric comorbidities

59% of the sample showed positive results for anxiety disorder (HAD-A score ≥ 11) and 27% for depressive disorder (HAD-D score ≥ 11). One third of the patients (N=22 (31%)) tested positive for hypersexuality disorder, with a SAST score ≥ 13. The same proportion (N=18 (27%)) had an alcohol use disorder (AUDIT score ≥ 12). 58 (82%) of patients had an overall psychiatric comorbidity, defined as at least one of the 4 disorders.

Attachment style

Only 8 (11%) had a secure AS. Of the 89% (63) of insecure men, 39% (28) were classified as preoccupied, 24% (17) were fearful and 25% (18) dismissing. Overall, there were 24 (34%) patients with a SM+ versus 47 (66%) with a SM-. Regarding the OM, half (N=35 (49%)) had a OM+ and the other half a OM- (N=36 (51%)).

- ***Chemsex (Table 2)***

Practice

Cathinones (especially 3-MMC) were the most commonly used substances (N=68 (96%)), followed by GBL / GHB (N=60 (85%)), cocaine (N=51 (72%)) and methamphetamine (N=42 (59%)). Concurrent use of erectile drugs was also found in 50 (70%) patients.

46 (65%) patients practiced slamsex. 43 (61%) practiced chemsex alone, using porn with drugs. 30 (42%) patients had not been able to have sex without substances within the last 6 months. When they were asked to rate the quality of their sexual life out of ten before chemsex and at the present time, there is a drop from 6.5 (SD 2.1) to 5.5 (SD 2.6) (p=0.013, see Figure 1).

Complications

27 (38%) patients had experienced a loss of consciousness during chemsex and 31 (44%) psychotic symptoms after chemsex. 20 (28%) had already been to an Emergency Department because of

chemsex and 7 (9.9%) had already been admitted to an Intensive Care Unit. More than half of patients (N=46 (65%)) had already missed a day of work or an important social event (N=40 (56%)) because of chemsex.

- **Self and other models (Table 3)**

Self model

We divided the cohort to compare two groups: SM+ (N=24 (34%)) and SM- (N=47 (66%)) patients. SM- patients practiced more alone than SM+ patients (75% vs 33%, p<0.001). SM- patients were admitted in ICU (15% vs 0% p=0.046), had more overall comorbidities (92% vs 63%, p=0.003), particularly anxiety (HAD-A mean 12.5 (SD 3.5) vs 9.5 (SD 4.0), p=0.009) and sexual addiction (SAST mean 11.2 (SD 4.4) vs 8.3 (SD 5.5), p=0.022). We also found more social consequences among SM- patients who were more susceptible to miss an important social event (66% vs 38% p=0.022). SM- patients were slightly but significantly older (mean age 38 (SD 8.5) vs 43 (SD 10), p = 0.041).

Other model

Then we divided the cohort to compare two groups: OM+ (N=35 (49%)) and OM- (N=36 (51%)) patients. OM- patients used PreP more than OM+ (53% vs 29%,p=0.038), and have more overall comorbidities (92% vs 71%, p=0.027). OM+ patients practice more slamsex than OM- patients (80% vs 50%, p=0.008). OM- patients.

Discussion

- **Psychiatric comorbidities and attachment styles**

In the present study, we evaluated mental health history, psychiatric comorbidities, AS and its impact on the severity of chemsex practice within a population of 71 GBMSM seeking help for problematic chemsex.

Half of patients experienced psychotic symptoms or unconsciousness while practicing chemsex, which is consistent with the literature (Hampel et al., 2020). These complications often lead to hospitalization, with 28% being admitted to an Emergency Roomand 9.9% to an ICU. 65% declared absenteeism at work related to chemsex. These severe complications give insight into the urgent need to offer the GBMSM community proper care for those who report problematic chemsex. Some studies, based on the possible links to sexual addiction, list possible medications and propose innovative transcranial stimulation neuromodulation (Malandain, Blanc, Ferreri, & Thibaut, 2020; Malandain, Blanc, Ferreri, Giorgiadis, et al., 2020). Mirtazapine helps reduce consumption and maintain abstinence of sexualized methamphetamine use (Coffin et al., 2020; Trivedi et al., 2021).

Few studies evaluate psychotherapy and AS among GBMSM with problematic chemsex (Cartner, 2022; González-Baeza et al., 2023). Sixty-three (89%) of the participants of our study had an insecure AS. González-Baeza *et al.* showed that 81% of the 41 participants engaged in chemsex and 57% of the GBMSM control group had an insecure AS. This can be compared with the fact that a third of the general population displays an insecure AS (Mickelson et al., 1997). A meta-analysis of Schindler *et al.*(Schindler, 2019) showed consistent evidence of an association between insecure AS and substance abuse. An insecure attachment pattern increases the risk of SUD but substance use also predicts a deterioration in attachment relationships. Landolt et al.'s research showed that peer exclusion may contribute to the development of insecure attachment patterns in young gay men (Landolt et al., 2004) .With problematic chemsex linked to substance use disorders affecting GBMSM, attachment theory is therefore crucial to understanding these vulnerabilities.

Attachment theory stresses the importance of the therapeutic alliance in developing attachment security (Schindler, 2019). Specific engagement strategies can be developed and tailored to individual attachment patterns. Avoidant individuals could have more difficulties establishing therapeutic relationships. Attachment-based psychotherapies are well studied in treating patients with personality disorders, depression and in adolescents (Heerde et al., 2019; Stefini et al., 2013). They can also achieve positive outcomes in the care of GBMSM with problematic chemsex (Cartner, 2022).

Lafortune *et al.* identify dealing with painful emotions or stressful events, giving into interpersonal pressure or fulfilling desire for community belonging as psychological and interpersonal factors associated with chemsex-related behaviors (Lafortune et al., 2021). This was consistent with our findings. Mental health background is therefore crucial to understanding GBMSM who report problematic chemsex. 82% (58) of our sample had a dual diagnosis among depression, anxiety, AUD or sexual addiction. In the literature, psychiatric comorbidities seemed lower, but remained significantly higher than in the general population (Hampel et al., 2020; Vu et al., 2017). Bohn *et al.*(Bohn et al., 2020) found that 8.3% and 11.9% of GBMSM with chemsex use suffer from anxiety and depressive disorders, respectively, compared to 59% and 27% in our study. We investigated a care-seeking population whereas Bohn *et al.* performed an online survey, potentially recruiting GBMSM who do not have problematic chemsex and complications. Regarding hypersexual disorder, there is an overlap between the item of the SAST and chemsex. Most chemsex users spent much more time than they wished practicing sex or considered that their sex life negatively affects their health. This can explain the high proportion (31%) of patients with positive diagnosis at the SAST. An adapted version of a hypersexuality scale could be useful in this specific population.

Patients in our sample presented a high rate of difficult or traumatic life events. One-third of the sample declared childhood sex abuse, as described in a systematic review about childhood sexual

abuse among GBMSM (Lloyd & Operario, 2012). Among young GBMSM, co-occurrence of childhood sexual abuse, other psychological and social problems, or substance abuse are associated with higher rates of sexual risk behavior (Mustanski et al., 2007). Exposure to early adverse events appears to generate abnormal central nervous system maturation due to high levels of cortisol exposure (Raymond et al., 2018). Trauma theories consider that adverse early traumatic experiences could overwhelm a child's developmental capacity to manage emotions leading to dysregulation of AS (Fassbinder et al., 2016). One quarter of the sample self-reported lifetime suicidal ideation. It is more than the 11-13% found in the larger GBMSM population (Lian et al., 2015; Rüütel et al., 2017). GBMSM with problematic chemsex could be an at-risk subgroup of GBMSM, who are themselves at a higher risk for mental health disorder than the general population. The higher prevalence in SUD found in LBGTQ+ community has been described as a unhealthy way of coping with systemic homophobia (Avery-Desmarais et al., 2020) .

- **Influence of the self and other models**

We explored SM and OM to determine risk factors of complications of chemsex (Table 3). GBMSM with SM- or OM- showed higher rates of overall psychiatric comorbidities. GBMSM with SM- or OM- should benefit the most from psychotherapy. 46 (65%) of our patients practiced slamsex, and OM+ more than OM- patients. We could hypothesize that OM+ users view others as more trustworthy in sexual intercourse, as they are less likely to use PrEP. False beliefs about the perceived trustworthiness of sex partners should be integrated into tailormade harm reduction intervention, based on attachment style.

- **Strengths and limitations**

The first strength of this study is the description of detailed mental health background within a GBMSM sample with problematic chemsex. The demographic and clinical data of our sample are compatible with larger studies investigating chemsex (Blomquist et al., 2020; Giorgetti et al.,

2017; Nimbi et al., 2020; Reback et al., 2013; Schmidt et al., 2016; Vu et al., 2017), but with more precise data. The exploration of the AS of patients lead to new opportunities in terms of care and psychotherapy. Among the limitations of this paper is the small sample size, which lowers the strength of the study. There may also be a recruitment bias: patients sought care and therefore already had a certain insight into their trouble. It could be useful to compare this data with a larger sample of GBMSM who practice non-problematic chemsex. A better comprehension of the complications of chemsex could lead to the definition of gravity criteria, which are a crucial need in clinical practice.

Conclusion

Firstly, as problematic chemsex involves substance use disorder and interpersonal relationships, AS theory could be useful in clinical practice. In psychotherapy, Gidhadgen *et al.*(Gidhagen et al., 2018) suggest that a change from insecure to secure AS is an important goal for SUD care, as it may prevent the patient from using substances to regulate emotions and interpersonal relationships. The AS could be assessed and become part of individual treatment planning and harm reduction strategy.

Secondly, GBMSM with people who report problematic chemsex are particularly vulnerable in mental health terms, with frequent history of abuse, suicidal ideation as well as a majority presenting psychiatric comorbidities. Mental health screening should be offered to GBMSM with problematic chemsex, as well as the possibility to be referred to a mental health professional. Our results show that strong interaction is needed between sexual health clinics, community service and mental health service. This could have a strong impact on patient outcomes, as the guidelines for dual diagnosis show that co-occurent SUD and a psychiatric disorder should be diagnosed and treated to improve global care and prognosis (Tikka et al., 2014). Integrated intervention models designed for GBMSM should be implemented to address the specific need for sexual and mental health.

Finally, the emergence of NPS shows the necessity for a monitoring of the substance used in the chemsex practice. Chemsex scene and substance use are constantly evolving , with an increase of the use of synthetics cathinones that is potentially understated (Daziani et al., 2023; Gomila Muñiz et al., 2022). Knowing the specificity of the substance used and the practice makes it possible to prevent complications and propose tailored treatment approaches based on community and clinical practices (Pires et al., 2022).

As chemsex is one of the greatest challenges that the GBMSM and LGBTQ+ community is facing, there is an urgent need for integrated intervention between sexual addiction and mental health services to improve community care.

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Conflict of interest:

The authors declare no conflict of interest related to this article.

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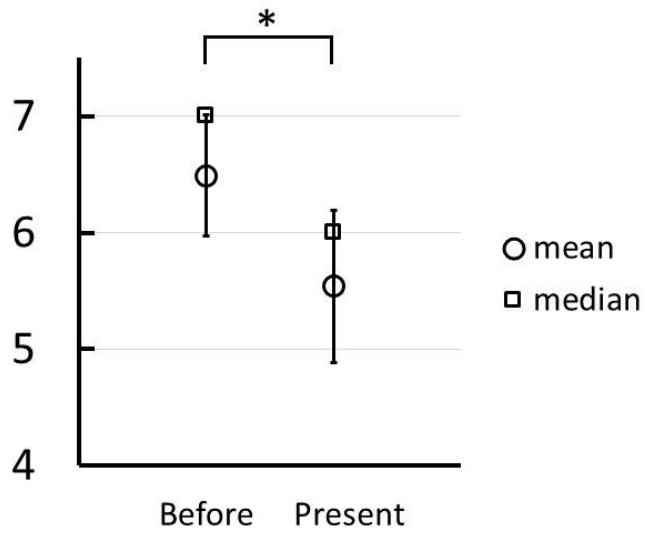

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750 **Figure 1.** Quality of sexual life before chemsex use disorder and at the time of assessment, rated
751 by patients with a 0 to 10 numerical scale. * means $p < 0.05$.

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N=71	N (%) or mean (SD)
Demographic Characteristics	
Age	40 (9.3)
Relationship Status	28 (39)
Diploma **Middle School** **High School** **Undergraduate Degree** **Graduate Degree**	 6 (8.0) 14 (20) 15 (21) 36 (51)
Employed	63 (89)
Sexual Orientation **Homosexual** **Bisexual**	 67 (94) 4 (5.6)
Medical and Psychiatric History	
HIV Positive **Undetectable Viral Charge**	36 (51) 33 (92)
Receiving PrEP Treatment	29 (41)
History of Hepatitis C Infection	18 (25)
History of Sexual Abuse	22 (31)
Mental Health History psychiatric care psychological care inpatient in psychiatry department antidepressant treatment suicide attempt childhood psychiatric follow-up	 48 (67) 53 (75) 22 (31) 36 (51) 17 (24) 8 (11)
Psychiatric Comorbidities and Attachment Style	
Depressive Disorder (HAD-D score ≥ 11) **Anxiety Disorder** (HAD-A score ≥ 11) **Alcohol Use Disorder** High-risk consumption (AUDIT score 8-12) Alcohol dependence (AUDIT score ≥ 12**)** **Sexual addiction** (SAST score ≥ 13)	19 (27) 42 (59) 7 (10) 18 (27) 22 (31)
Attachment Style (RSQ) **Secure** **Fearful** **Dismissing** **Preoccupied**	 8 (11) 17 (24) 18 (25) 28 (39)

Table 1. Characteristics of the patients. HAD: Hospital Anxiety and Depression scale. AUDIT: Alcohol use disorder identification test. SAST: Sexual addiction screening test. RSQ: relationship scales questionnaire. Percentages or standard deviations (SD) are in parentheses.

757

N=71	N (%)
Chemsex Practice	
Slamsex	46 (65)
Use chemsex substance alone	43 (61)
Sex without substance within the last 6 months	41 (58)
PrEP Treatment	29 (41)
Substances Used	
Cathinones	68 (96)
GHB/GBL	60 (85)
Cocaine	51 (72)
Erectile dysfunction drugs	50 (70)
Methamphetamine	42 (59)
MDMA	32 (46)
Ketamine	26 (37)
Complications Resulting from Chemsex	
Emergency department consultation	20 (28)
Intensive Care Unit admission	7 (9.9)
Psychotic symptoms	31 (44)
Loss of consciousness during chemsex	27 (38)
Overall psychiatric comorbidity	58 (82)
Missed a day of work	46 (65)
Missed an important event	40 (56)

758 **Table 2.** Chemsex practice and complications. Percentages are in parentheses.

759

	Self model			Other model		
N=71	**SM+ (N=24)**	**SM- (N=47)**	**p-value**	**OM+ (N=35)**	**OM- (N=36)**	**p-value**
Chemsex practice						
Slamsex	14 (58)	32 (68)	0.416	28 (80)	18 (50)	0.008
Practice chemsex alone	8 (33)	35 (75)	<0.001	20 (57)	23 (64)	0.561
Sex without substance within the last 6 months	15 (63)	26 (55)	0.562	23 (66)	18 (50)	0.180
Use of PrEP	9 (38)	20 (43)	0.682	10 (29)	19 (53)	0.038
Complications Resulting from Chemsex						
Emergency Department consultation	5 (21)	15 (32)	0.326	9 (26)	11 (31)	0.650
Intensive Care Unit admission	0 (0.0)	7 (15)	0.046	4 (11)	3 (8.3)	0.662
Psychotic symptoms	12 (50)	19 (40)	0.442	16 (46)	15 (42)	0.731
Loss of consciousness during chemsex	6 (25)	21 (45)	0.106	14 (40)	13 (36)	0.736
Overall psychiatric comorbidity	15 (63)	43 (92)	0.003	25 (71)	33 (92)	0.027
Missed a day of work	14 (58)	32 (68)	0.416	23 (66)	23 (64)	0.872
Missed an important event	9 (38)	31 (66)	0.022	21 (60)	19 (53)	0.540

Table 3. Chemsex practice and complications comparing MS+ and MS- patients and MO+ and MO- patients. Percentages are in parentheses.