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# 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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1 **Attachment and mental health of men having sex with men engaging in**  
2 **chemsex: is substance abuse only the tip of the iceberg?**

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26

27 **Abstract**

28 Gay and bisexual men and other men who have sex with men (GBMSM) with problematic  
29 chemsex (a specific sexualized drug use pattern) face several health issues. The aim of this  
30 monocentric observational study was to assess mental health history and attachment style (AS)  
31 within 71 GBMSM seeking care for problematic chemsex. Attachment style (AS) was evaluated  
32 using the Relationship Scales Questionnaire. 82% of the cohort (58) had at least one mental health  
33 disorder (among depression, anxiety, alcohol use disorder or hypersexuality). 9.9% were admitted  
34 to intensive care due to chemsex use. Traumas were frequent, with 31% reporting childhood sex  
35 abuse and 24% declaring having attempted suicide. 62 (87%) had insecure AS: 38% preoccupied,  
36 23% fearful and 24% dismissing. Users with a positive self model (N=24) had fewer comorbidities  
37 (63% vs 92%,  $p=0.003$ ) and practiced more chemsex alone (75% vs 33%,  $p<0.001$ ) than users  
38 with negative self model (N=47) . Users with a positive other model (N=35) practiced more  
39 slamsex (injections of substance in a sexual context) ( 80% vs 50%,  $p=0.008$ ) and had fewer  
40 comorbidities ( 71% vs 92%,  $p=0.027$ ) than users with negative other model (N=36). Attachment  
41 theory is a way to provide holistic and tailored and harm reduction.

42

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

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46

## 47 **Introduction**

48 Chemsex (contraction of “chemical sex”) is commonly understood as the use of specific drugs,  
49 specifically for sex, to reduce inhibition and enhance sexual pleasure, by gay and other men who  
50 have sex with men (GBMSM) (Amundsen et al., 2023; Sewell et al., 2019; Stuart, 2019). Specifics  
51 substances used are cathinone, methamphetamine, mephedrone,  $\gamma$ -hydroxybutyric acid/ $\gamma$ -  
52 butyrolactone (GHB/GBL), cocaine and ketamine (Batisse et al., 2016; Nimbi et al., 2020). In 75%  
53 of chemsex acts, some combination of these drugs is used (Batisse et al., 2016; Schreck et al.,  
54 2020). “*Slamming*” or “*slamsex*” defines substance injections in a sexual context (Blomquist et al.,  
55 2020; Bourne et al., 2015). Few studies evaluate the prevalence of chemsex use outside a clinical  
56 population. Of a sample of 30294 GBMSM in the United States, 10% reported chemsex drug use  
57 in the past 12 months (Ivey et al., 2023). Edmundson *et al.* report in a literature review in the  
58 United Kingdom that 17% of GBMSM attending sexual health clinics and 31% of HIV-positive  
59 GBMSM inpatients practice chemsex (Edmundson et al., 2018). Of 1589 HIV-positive GBMSM  
60 in the Chems4EU study, which covered GBMSM from four European countries, 24.0% reported  
61 practicing chemsex and 6.5% reported practicing slamsex in the previous 12 months (Whitlock et  
62 al., 2021). Motivations for engagement in chemsex include emotional connection, bodily  
63 sensations, disinhibition, and desire. Substances induce an increase in libido, confidence,  
64 disinhibition, and stamina (Diestelmann et al., 2018; Moyle et al., 2020). Clinical experience and  
65 gender studies report that for some GBMSM, chemsex causes an experience of sense of  
66 collectivity and therefore the rise of chemsex can be linked to an embodied response to material  
67 conditions shaped by neoliberalism and feelings of loneliness (Hakim, 2019). Tan et al. described  
68 how some GBMSM used chemsex as a coping mechanism to deal with emotional and situational  
69 triggers, such as HIV-related stigma, racism, sexual violence, death and loss, neglect, and  
70 internalized homophobia (Tan et al., 2021).

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

73 GHB can result in severe overdose with unconsciousness among 25% of users or even death  
74 (Mason & Kerns, 2002; Weatherburn et al., 2017). Chemsex is associated with a high risk of  
75 sexually transmitted infections (STI) such as HIV, hepatitis C, hepatitis B, syphilis, both because  
76 of drug use patterns and associated sexual behaviors (such as unprotected anal intercourse or group  
77 sex) (Rana et al., 2019). Slamsex brings additional risks of HIV and Hepatitis C infection if needles  
78 or other injecting equipment are shared. Acute psychiatric consequences are frequent: panic  
79 attacks, psychotic symptoms, suicidal thoughts, severe agitation requiring hospitalization (Batisse  
80 et al., 2016; Diestelmann et al., 2018; McKetin et al., 2013). Not all GBMSM who engage in  
81 chemsex experience psychiatric symptoms; however, a relationship between drug use and mental  
82 health may exist in various studies. Íncera-Fernández et al. showed in a systematic review that  
83 75% of the studies analyzed indicated a relationship between chemsex and negative mental health  
84 outcomes, 50% found a positive association between chemsex and depression symptoms, 33%  
85 between chemsex and anxiety symptoms and 25% between practicing chemsex and suicidal  
86 ideation (Íncera-Fernández et al., 2021). Dual diagnosis, as the co-occurrence of a substance use  
87 disorder (SUD) and a psychiatric disorder, is frequent with GBMSM who report problematic  
88 chemsex. Psychiatric comorbidities are therefore common: depression (up to 50% of chemsex  
89 users, 9.6% report a suicide attempt in their lifetime (Bohn et al., 2020; Hampel et al., 2020)),  
90 anxiety disorder (Prestage et al., 2018), alcohol use disorder (AUD) (up to 16% are high-risk  
91 drinkers (Lea et al., 2015)) and opioid use disorder (Paschen-Wolff et al., 2022). The role of  
92 hypersexuality is unclear (Malandain, Blanc, Ferreri, & Thibaut, 2020; Miner et al., 2016). Prior  
93 mental health vulnerabilities of problematic chemsex users have been less studied to date (Bohn  
94 et al., 2020; Íncera-Fernández et al., 2021). It would be crucial to determine if the mental health  
95 outcomes are present before engaging in chemsex, and which factors are related to its genesis and  
96 maintenance. Sexual minorities (people with a homosexual or bisexual sexual orientation)  
97 experience worse mental health outcomes compared to the heterosexual population (Burton et al.,  
98 2013). This has been associated with formal factors (such as legal sanctions) or informal factors

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

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

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

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

152

## 153 **Methods**

154

### 155 • *Participants*

156 We assessed an exhaustive cohort of 71 GBMSM over the age of 18, who report problematic  
157 chemsex and self-referred to the substance use service in the Saint-Antoine Hospital in Paris,  
158 France, between January 2018 and April 2022. All information was self-reported by patients in  
159 routine care and anonymized. Since the enactment of the "Jardé" Law (n° 2012-300 of March 5,  
160 2012, relating to research involving the human person), there is no need for an ethics committee in  
161 a non-interventional study of routine care. All the patients gave written consent and none of them  
162 refused to participate in the study. We only used medical data available in their electronic health  
163 record for research (AP-HP Health Data Warehouse (EDS)).

### 164 • *Assessments and evaluation tools*

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

168

### 169 *Psychometric assessment of comorbidities*

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



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

176

### 177 *Relationship Scales Questionnaire (RSQ)*

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

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

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

199

200       • *Statistics*

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

205

206   **Results**

207

208       • *Epidemiology (Table 1)*

209

210   *Demographic characteristics*

211 71 patients were included. The age of the respondents ranged from 22 to 61 years (mean = 40  
212 years, SD 9.3). All of our respondents were cisgender men, 67 (94%) of them identified as  
213 homosexual, the others as bisexual. 28 (39%) were in a relationship. The majority of respondents  
214 were employed (N=63 (89%)) and had obtained at least an undergraduate degree (N=51 (72%)).

215

216   *Physical and mental health history*

217 36 (51%) patients reported being HIV positive, 92% of them (N=33) having an undetectable viral  
218 charge. 29 (25%) patients were under PrEP.

219 48 (67%) reported having seen a clinical psychiatrist and 53 (75%) having seen a psychologist  
220 before inclusion in the study. 22 (31%) had already been hospitalized in a psychiatric ward, and  
221 36 (51%) had already taken an antidepressant medication. 17 (24%) had attempted suicide. 8  
222 (11%) had seen a pedopsychiatrist in their lifetime. 22 (31%) reported childhood sex abuse.

223

224   *Psychiatric comorbidities*

225 59% of the sample showed positive results for anxiety disorder (HAD-A score  $\geq 11$ ) and 27% for  
226 depressive disorder (HAD-D score  $\geq 11$ ). One third of the patients (N=22 (31%)) tested positive  
227 for hypersexuality disorder, with a SAST score  $\geq 13$ . The same proportion (N=18 (27%)) had an  
228 alcohol use disorder (AUDIT score  $\geq 12$ ). 58 (82%) of patients had an overall psychiatric  
229 comorbidity, defined as at least one of the 4 disorders.

230

### 231 *Attachment style*

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

236

### 237 • *Chemsex (Table 2)*

238

#### 239 *Practice*

240 Cathinones (especially 3-MMC) were the most commonly used substances (N=68 (96%)),  
241 followed by GBL / GHB (N=60 (85%)), cocaine (N=51 (72%)) and methamphetamine (N=42  
242 (59%)). Concurrent use of erectile drugs was also found in 50 (70%) patients.

243 46 (65%) patients practiced slamsex. 43 (61%) practiced chemsex alone, using porn with drugs.  
244 30 (42%) patients had not been able to have sex without substances within the last 6 months. When  
245 they were asked to rate the quality of their sexual life out of ten before chemsex and at the present  
246 time, there is a drop from 6.5 (SD 2.1) to 5.5 (SD 2.6) ( $p=0.013$ , see Figure 1).

247

#### 248 *Complications*

249 27 (38%) patients had experienced a loss of consciousness during chemsex and 31 (44%) psychotic  
250 symptoms after chemsex. 20 (28%) had already been to an Emergency Department because of

251 chemsex and 7 (9.9%) had already been admitted to an Intensive Care Unit. More than half of  
252 patients (N=46 (65%)) had already missed a day of work or an important social event (N=40  
253 (56%)) because of chemsex.

254

255 • **Self and other models (Table 3)**

256

257 *Self model*

258 We divided the cohort to compare two groups: SM+ (N=24 (34%)) and SM- (N=47 (66%))  
259 patients. SM- patients practiced more alone than SM+ patients (75% vs 33%,  $p<0.001$ ). SM-  
260 patients were admitted in ICU (15% vs 0%  $p=0.046$ ), had more overall comorbidities (92% vs  
261 63%,  $p=0.003$ ), particularly anxiety (HAD-A mean 12.5 (SD 3.5) vs 9.5 (SD 4.0),  $p=0.009$ ) and  
262 sexual addiction (SAST mean 11.2 (SD 4.4) vs 8.3 (SD 5.5),  $p=0.022$ ). We also found more social  
263 consequences among SM- patients who were more susceptible to miss an important social event  
264 (66% vs 38%  $p=0.022$ ). SM- patients were slightly but significantly older (mean age 38 (SD 8.5)  
265 vs 43 (SD 10),  $p = 0.041$ ).

266

267 *Other model*

268 Then we divided the cohort to compare two groups: OM+ (N=35 (49%)) and OM- (N=36 (51%))  
269 patients. OM- patients used PreP more than OM+ (53% vs 29%,  $p=0.038$ ), and have more overall  
270 comorbidities (92% vs 71%,  $p=0.027$ ). OM+ patients practice more slamsex than OM- patients  
271 (80% vs 50%,  $p=0.008$ ). OM- patients.

272

273

274

275

276 **Discussion**

277

278       • **Psychiatric comorbidities and attachment styles**

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

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

292     Few studies evaluate psychotherapy and AS among GBMSM with problematic chemsex (Cartner,  
293     2022; González-Baeza et al., 2023). Sixty-three (89%) of the participants of our study had an  
294     insecure AS. González-Baeza *et al.* showed that 81% of the 41 participants engaged in chemsex  
295     and 57% of the GBMSM control group had an insecure AS. This can be compared with the fact  
296     that a third of the general population displays an insecure AS (Mickelson et al., 1997). A meta-  
297     analysis of Schindler *et al.* (Schindler, 2019) showed consistent evidence of an association between  
298     insecure AS and substance abuse. An insecure attachment pattern increases the risk of SUD but  
299     substance use also predicts a deterioration in attachment relationships. Landolt et al.'s research  
300     showed that peer exclusion may contribute to the development of insecure attachment patterns in  
301     young gay men (Landolt et al., 2004). With problematic chemsex linked to substance use disorders  
302     affecting GBMSM, attachment theory is therefore crucial to understanding these vulnerabilities.

303

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

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

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

329 abuse among GBMSM (Lloyd & Operario, 2012). Among young GBMSM, co-occurrence of  
330 childhood sexual abuse, other psychological and social problems, or substance abuse are  
331 associated with higher rates of sexual risk behavior (Mustanski et al., 2007). Exposure to early  
332 adverse events appears to generate abnormal central nervous system maturation due to high levels  
333 of cortisol exposure (Raymond et al., 2018). Trauma theories consider that adverse early traumatic  
334 experiences could overwhelm a child's developmental capacity to manage emotions leading to  
335 dysregulation of AS (Fassbinder et al., 2016). One quarter of the sample self-reported lifetime  
336 suicidal ideation. It is more than the 11-13% found in the larger GBMSM population (Lian et al.,  
337 2015; Rüütel et al., 2017). GBMSM with problematic chemsex could be an at-risk subgroup of  
338 GBMSM, who are themselves at a higher risk for mental health disorder than the general  
339 population. The higher prevalence in SUD found in LBGTQ+ community has been described as a  
340 unhealthy way of coping with systemic homophobia (Avery-Desmarais et al., 2020) .

341

#### 342 ● **Influence of the self and other models**

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

350

#### 351 ● **Strengths and limitations**

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

355 2017; Nimbi et al., 2020; Reback et al., 2013; Schmidt et al., 2016; Vu et al., 2017), but with more  
356 precise data. The exploration of the AS of patients lead to new opportunities in terms of care and  
357 psychotherapy. Among the limitations of this paper is the small sample size, which lowers the  
358 strength of the study. There may also be a recruitment bias: patients sought care and therefore  
359 already had a certain insight into their trouble. It could be useful to compare this data with a larger  
360 sample of GBMSM who practice non-problematic chemsex. A better comprehension of the  
361 complications of chemsex could lead to the definition of gravity criteria, which are a crucial need  
362 in clinical practice.

363

### 364 **Conclusion**

365 Firstly, as problematic chemsex involves substance use disorder and interpersonal relationships,  
366 AS theory could be useful in clinical practice. In psychotherapy, Gidhadgen *et al.* (Gidhagen et al.,  
367 2018) suggest that a change from insecure to secure AS is an important goal for SUD care, as it  
368 may prevent the patient from using substances to regulate emotions and interpersonal  
369 relationships. The AS could be assessed and become part of individual treatment planning and  
370 harm reduction strategy.

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



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

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

390

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393

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

396

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399

400 **References**

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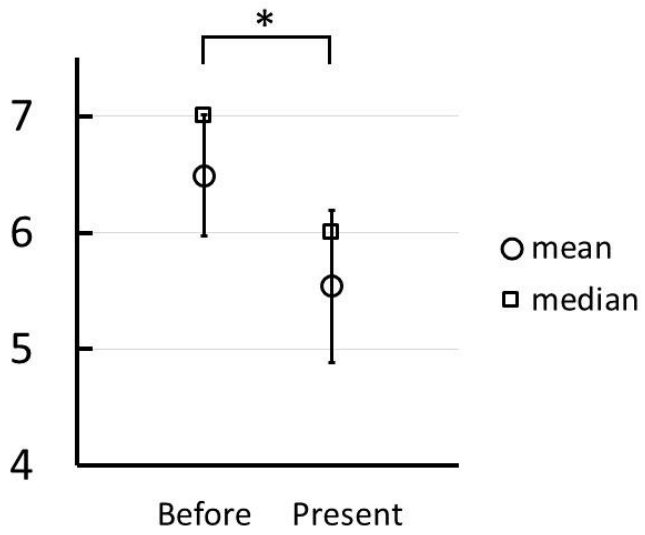
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750 **Figure 1.** Quality of sexual life before chemsex use disorder and at the time of assessment, rated  
751 by patients with a 0 to 10 numerical scale. \* means  $p < 0.05$ .

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

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

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

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

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

760 **Table 3.** Chemsex practice and complications comparing MS+ and MS- patients and MO+ and MO- patients.

761 Percentages are in parentheses.

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763