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Title - Do PrEP users engaging in chemsex experience their participation as problematic and how can they best be supported? Findings from an online survey in Belgium

Authors – Vanbaelen T.[a,b*], Rotsaert A.[b], Van Landeghem E.[b], Nöstlinger C.[b], Vuylsteke B.[b], Platteau T.[a], Herrijgers C.[a], Reyniers T.[b]

Affiliations – [a]Department of Clinical Sciences, Institute of Tropical Medicine, Nationalestraat 155, 2000 Antwerp, Belgium; [b]Department of Public Health, Institute of Tropical Medicine Nationalestraat 155, 2000 Antwerp, Belgium

*corresponding author: Thibaut Vanbaelen; Institute of Tropical Medicine, Nationalestraat 155, 2000 Antwerp, Belgium; tel.: +32 (0) 3 345 58 14; email: tvanbaelen@itg.be

Authors contributions statement – **Thibaut Vanbaelen**: conceptualization, methodology, formal analysis, writing – original draft. **Anke Rotsaert**: conceptualization, methodology, investigation, writing – review and editing. **Ella Van Landeghem**: writing – review and editing. **Christiana Nöstlinger**: writing – review and editing. **Bea Vuylsteke**: conceptualization, writing – review and editing, supervision. **Tom Platteau:** conceptualization, writing – review and editing. **Corinne Herrijgers:** conceptualization, writing – review and editing. **Thijs Reyniers**: conceptualization, methodology, investigation, writing – review and editing, supervision.

Summary text –

One third of HIV pre-exposure prophylaxis users engage in chemsex (or sexualized drug use) and about one in four experience negative consequences of it. Nearly half of them reported to be willing to reduce the chemsex-related risks with healthcare providers and online apps as preferred support options. We recommend embedding comprehensive chemsex support in the PrEP package of care and developing novel tools and interventions in order to reach maximum impact.

Keywords – chemsex; HIV; pre-exposure prophylaxis; substance use; support; harm reduction; MSM; mental health

Abstract

Background – Chemsex involves the use of psychoactive drugs in a sexual context and is a growing phenomenon among men who have sex with men and PrEP users. Investigating how its negative consequences can be avoided is important. The objective of this study was to explore the perceived impact of chemsex, the willingness to reduce chemsex activities and associated risks and preferred interventions to do so among PrEP users.

Methods – We analyzed data from an online survey among PrEP users in Belgium. Chemsex was assessed in two questionnaires distributed between September 2020 and January 2022.

Results – A total of 326 participants completed the baseline questionnaire, and 186 the follow-up questionnaire. About one in three (36.5%, 119/326) reported engaging in chemsex, and half of those (49.6%, 59/119) were willing to reduce chemsex-related risks. The most preferred strategies for reducing risks were online support via an app (37.3%, 22/59) and face-to-face counselling with a healthcare professional (30.5%, 18/59). Among those reporting recent chemsex in the follow-up questionnaire, about one in five (21.9%, 14/64) wanted to reduce or stop chemsex activities. About 23.4% (15/64) also reported experiencing negative consequences of chemsex on their health, social or professional life.

Conclusion – Our findings show that one in four PrEP users engaging in chemsex experienced negative consequences of these activities and about one in five was willing to reduce or stop chemsex activities. We recommend embedding comprehensive chemsex support in the PrEP package of care and developing novel tools and interventions in order to reach maximum impact.

Introduction

Chemsex is a growing phenomenon, typically involving the use of psychoactive drugs such as methamphetamine, mephedrone, or gamma-hydroxybutyrate/gamma-butyrolactone (GHB/GBL) during sexual activity (1–4). However, no uniform definition exists and other substances such as ketamine, ecstasy, cocaine and 3-Methylmethcathinone (3MMC) have also been considered in this context (3,5,6). Participating in chemsex is more prevalent amongst men who have sex with men (MSM) than in the general population (1–4). Given the lack of a clear definition, the exact prevalence of MSM who engage in chemsex remains hard to estimate and ranges from 3.6% to 93.7% (2). MSM represent the majority of human immunodeficiency virus (HIV) pre-exposure prophylaxis (PrEP) users in Belgium, a population in which engagement in chemsex is also frequent (3,7,8). For instance, in a Belgian HIV and PrEP clinic, about half of the PrEP users were found to have combined drugs and sex in the past three months (8).

Recent literature described a variety of reasons to engage in chemsex, ranging from reducing inhibition, increasing self-esteem and confidence, enhancing sexual pleasure and prolonging sexual activities, to escaping loneliness and mental health issues (5,9,10). However, it also involves risks related to substance use, including addiction and overdose (6,11). Chemsex is associated with behaviors that can increase the risk for sexually transmitted infections (STIs) such as condomless anal sex, group sex and transactional sex (2,3,12). Various studies found that MSM engaging in chemsex had higher rates of hepatitis C, HIV and bacterial STIs such as syphilis or gonorrhoeae (2,3,11–13). It has been demonstrated that mental health issues, such as depression, anxiety, and suicidal ideation are more frequently present in MSM engaging in chemsex (14,15). Chemsex can thus act as a syndemic condition with other psychosocial problems within the HIV and STIs epidemics (4,6,16). Therefore, concerns have been

raised that chemsex may hamper the effectiveness of prevention interventions such as PrEP, for example by increasing HIV risk behaviors or decreasing adherence to PrEP (3,16). However, research regarding the effects of chemsex on chemsex participants' lives are limited.

In July 2022, the World Health Organization acknowledged the need for addressing this growing chemsex phenomenon among MSM (4). It recommends a patient-centered, non-judgmental approach that covers all chemsex-related harms from drug-related risks to mental and sexual health (4). It remains unclear which interventions and strategies would be most effective in reducing the risks associated with chemsex.

The main objective of this study was to explore the perceived negative effects of chemsex among PrEP users in Belgium, their willingness to reduce chemsex and associated risks, and their preferred options or tools to reduce such risks. Such insights could help develop acceptable and effective strategies to support MSM engaging in chemsex and reduce the negative consequences of chemsex.

Methods

Study design and participants

We conducted an online survey among PrEP users in Belgium to investigate sexual behavior and PrEP-related topics. The detailed methodology of this survey has been published previously (17). Briefly, between September 2020 and January 2022, we distributed three questionnaires with approximately six months in between (one baseline and two follow-up questionnaires). The baseline questionnaire assessed mainly occurrence of chemsex-related activities, willingness to reduce related risks and preferred support strategies. In the second follow-up questionnaire, we further explored interesting themes that emerged from the baseline questionnaire, such as the perceived impact of chemsex (see Appendix 1). Therefore, only data from these two questionnaires

is presented in this analysis. In this study, we defined chemsex as combining stimulant drugs and sex.

Participants were recruited through social media of community organizations, HIV reference centers delivering PrEP and social or sexual networking applications such as Grindr. Eligibility criteria were being at least 16 years old; reporting an HIV negative or unknown serostatus; living in Belgium; and having used PrEP in the six months preceding the baseline questionnaire. Participants consenting to be contacted for follow-up questionnaires were invited to complete these via a personal link sent via email. The questionnaires were available in Dutch, English and French and pilot tested by research team members and MSM community organization representatives. Participants who completed all three questionnaires could win one of three €100 vouchers

Baseline questionnaire

In the baseline questionnaire, we assessed socio-demographic factors (e.g., age, education level, gender), sexual behavior as well as engagement in chemsex in the previous three months. We assessed the latter by using the question “In the last three months, how much of the sex you've had has been under the influence of stimulant drugs?”. Participants had to choose among the following answers: “none of it”, “almost none of it", “less than half”, “about half”, "more than half”, “almost all of it” and “all of it”. Participants who answered “none of it” were categorized as not having engaged in chemsex in the previous 3 months and all other participants as having engaged in chemsex. We then used filter logics in the questionnaire so that the following questions pertaining to chemsex only needed to be answered among those indicating to have engaged in chemsex. The willingness to reduce chemsex-related risks was assessed using the question “Would you be willing to reduce the risks that accompany chemsex?”. Participants could select the following options: “certainly, yes”, “rather yes”, “rather not” and “certainly not”. This variable was recoded, and the first two options were categorized

as “willing to reduce the risks that accompany chemsex” and the two last options as “not willing to reduce the risks that accompany chemsex”. The willingness to receive specific chemsex-related support was assessed among those willing to reduce the risks that accompany chemsex, using the following question: “What would help you to reduce your risks that accompany chemsex?”. Participants were presented with several options among which to choose, as well as a free text “other” option (see Appendix 1).

Follow-up questionnaire

In the second follow-up questionnaire, we assessed sexual behavior and engagement in chemsex in the previous six months. Using a similar methodology as for the baseline questionnaire, we used filter logics to additionally assess the perceived negative effects of chemsex and the willingness to reduce or stop chemsex among participants who reported engagement in chemsex. Lastly, all participants were asked whether they would like more attention to be paid to chemsex during PrEP consultations. The detailed questions can be found in Appendix 1.

Data analysis

We describe numerical variables using medians and interquartile ranges, and categorical variables using absolute numbers and proportions. To assess a potential attrition bias, we compared socio-demographic factors between participants of the baseline and follow-up questionnaires using Mann-Whitney U test for medians and chi-square test or Fisher’s exact test for proportions.

Ethics approval

We obtained ethical approval from the Institutional Review Board of the Institute of Tropical Medicine (IRB 1380/20). All participants provided consent before participation in the study. We pseudonymized all data before and upon data retrieval.

Results

Sample description

In total, 326 participants completed the baseline questionnaire, among whom 256 (78.5%) provided contact details and consented to participate in the follow-up questionnaires. One hundred eighty-seven (73.0%) participants completed the second follow-up questionnaire.

At baseline, the median age was 42 years (IQR 34-50, Table 1). Most participants were male (97.2, 317/326), highly educated (81.6%, 266/326), born in Belgium (85.6%, 279/326) and had health insurance (98.2%, 320/326). In the three months prior the baseline questionnaire, about half the participants reported having had one or more steady partners (50.3%, 164/326) and 1-5 occasional partners (48.5%, 158/326). About two thirds reported having had 1-15 anonymous partners (64.4%, 210/326). Most participants reported having had sex weekly with their steady partner(s) (52.9%, 64/121) and monthly with their occasional partners (42.5%, 111/261) or anonymous partners (41.1%, 92/224). We found no significant differences in these variables between respondents of the baseline and follow-up questionnaires (Table 1).

Baseline questionnaire

In the baseline questionnaire, about one-third (36.5%, 119/326) of the participants reported to have engaged in chemsex in the past three months. Among those, 57.9% (69/119) reported that half or more of the sexual encounters they had in the past three months were under the influence of stimulant drugs (Table 2). About one in five (17.6%, 21/119) chemsex users reported having been combining sex and drugs for less than one year, 54.6% (65/119) for one to five years and 27.7% (33/119) for more than five years (Table 2).

Among those who reported chemsex activities in the past three months, about half (49.6%, 59/119) reported to be willing to reduce the risks that accompany chemsex. Online support through an app was the most preferred support strategy (37.3%, 22/59), followed by face-to-face counselling with a health professional (30.5%, 18/59).

Follow-up questionnaire

In the follow-up questionnaire, about a third (34.2%, 64/187) of the participants reported having engaged in chemsex in the past six months (Table 3). Among those, 23.4% (15/64) also reported that chemsex sometimes had a negative impact on their health, social or professional life. Again 15 participants (23.4%) were concerned or very concerned that chemsex could lead to more negative consequences in the future. Fourteen participants engaging in chemsex activities (21.9%, 14/64) reported to be likely or extremely likely wanting to stop or reduce chemsex. A third of all participants (35.8%, 67/187) would like to see more attention given to chemsex during a PrEP consultation, while this was 40.6% (26/64) among those engaging in chemsex.

Discussion

Our study is among the first to assess the perceived impact of chemsex, the willingness to reduce chemsex activities and associated risks and preferred interventions to do so among PrEP users. We found that one in four experienced negative consequences of chemsex on their daily lives. We also found that half the PrEP users engaging in chemsex were willing to reduce the risks that accompany chemsex with support through an app or face-to-face counselling with health professionals as preferred options.

The finding that almost one in four PrEP users engaging in chemsex experienced negative impact on their health, social or professional life, resonates with a similar study among MSM in Ireland (11). However, in a Dutch study it was found that only 9% of MSM engaging in chemsex experience a negative impact on their daily live (5). Our data also

show that one in five is willing to stop or to engage less in chemsex related activities, similar as in the Dutch study (19%) (5). Our data also show that the majority of PrEP users engaging in chemsex do not experience a negative impact and are not willing to reduce or stop chemsex activities. It has been shown that some persons engaging in chemsex are well aware of the risks inherent to chemsex and apply different harm-reduction strategies by themselves, such as controlling the choice of drugs or the frequency of intake and therefore mitigate these harms (18). Nevertheless, our findings corroborate that a substantial part of those engaging in chemsex activities experience a negative impact on their lives and, among them there is an undeniable willingness to reduce chemsex activities and its related harms. There is a lack of effective behavioral interventions to address the risks that accompany chemsex (4). Therefore, finding ways to address this need will be crucial for achieving such behavioral changes.

We found that the most preferred strategies for reducing chemsex related risks were online support through an app or face-to-face counselling with a health care professional. This was also found in the Irish study where sexual health services and online tools were the preferred chemsex support options (11). Although counselling holds promise to support people who engage in chemsex, this type of support is disconnected from actual chemsex events. Smartphone applications may enable real-time support before, during and after chemsex, at times chosen by the user. Such applications have shown to be effective in digital health promotion in a wide range of health-related domains, for instance adherence to HIV medication or smoking cessation (19,20). Among MSM, online tools have been proven to be effective and acceptable for different HIV and STI prevention interventions (21). Digital tools for chemsex support have been considered as having a promising potential (22). Recently, an app for chemsex support has been developed in Belgium (23). This app, consisting in an information module and an individual support module, is evidence-based and was developed in collaboration with

MSM engaging in chemsex. Results on the effectiveness of this app are still pending but acceptability was very high in a pilot study among MSM (23). Our findings confirm that there may be great potential in developing and evaluating digital tools to support chemsex and reduce associated risks.

Health care professionals in general, and sexual health service professionals in particular, are often cited as a preferred source of information or support by respondents engaging in chemsex activities (5,11,24). This is in line with our study's findings as about 41% of those engaging in chemsex would like more attention to be paid to chemsex during PrEP consultations. These results emphasize the need for a comprehensive approach during (PrEP) consultations. This may be achieved by training and involving designated sexual health professionals. PrEP consultations represent an opportunity to do prevention on chemsex by informing, raising awareness, and promoting safe drug practices. They also represent an opportunity to assess and address the negative consequences and, if necessary, refer patients to adequate support services.

A surprising finding was that 6.8% preferred 'group counselling' to adapt their chemsex behavior. Group counselling is an approach that is often acknowledged by (community) organizations (25). Nevertheless, in our study, such an approach was only preferred by a small proportion of participants.

It is unlikely that chemsex can effectively addressed via a one-size-fits-all strategy and various harm-reduction strategies already exist (6,26). Strong et al. proposed an integrated harm-reduction scheme based on three chemsex related harms: HIV, drug, and sex related harms (6). Given this wide range of chemsex-related harms, the diversification of options, from support by health care professionals and apps to community or peer-based interventions may be crucial to reach a maximum of users in need of support and to tackle as much chemsex related harms as possible (6,22,24,27).

Potential self-selection is a limitation to our study, inherent to the study design, and cannot be fully excluded. Hence, the sample might not be representative of the entire PrEP population. Furthermore, due to the drop-out of participants between the baseline and the follow-up questionnaires, the sample size in the follow-up questionnaire is rather small, which may have introduced an information bias in our results. Secondly, as we asked about the occurrence of certain behaviors in the last three or six months, a recall bias cannot be excluded. Given the sensitive and intimate nature of this topic, participants might be prone to social desirability bias. We consider these potential biases may have led to an underestimation of chemsex, being a potentially stigmatized behavior. There are some inconsistencies in the formulation of the different questionnaires (e.g.: chemsex use in the past six months was assessed in the baseline questionnaire whereas chemsex use in the past three months was assessed in the follow-up questionnaire), making comparisons between these timepoints impossible. Finally, the survey took place over more than a year in periods of different COVID-19 restrictions. Since these restrictions impacted sexual behaviors (28), it cannot be excluded that f COVID-19 and the related restrictions may have affected our results.

Despite these limitations, our study sheds light on the magnitude of chemsex among PrEP users in Belgium, its associated perceived negative consequences, and the preferred support approaches to reduce chemsex-related harms. More research is needed on effective chemsex support approaches and their implementation in sexual health care services, with a focus on online interventions and trained health care professionals. Moreover, research is also required on how to raise awareness on the currently existing and future support options for chemsex users, and on how to address the barriers to chemsex support, in order to maximize their effectiveness.

Conclusion

In conclusion, we found that at least one in five PrEP users engaging in chemsex would like to reduce or stop engaging in such activities. Online applications and support from health care professionals were the most preferred approaches for chemsex-support. Based on our results, we recommend embedding comprehensive chemsex support in the PrEP package of care and support the development of novel strategies and tailored interventions to address the risks and potential health problems that accompany chemsex.

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Data availability statement – All relevant data has been published in the manuscript.

Conflicts of interest – The authors declare no conflicts of interest

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405 **Table 1 - Comparison of socio-demographic factors and sexual behavior at**
406 **baseline between the baseline and follow-up questionnaires**

	Baseline questionnaire (N=326)	Follow-up questionnaire (N=187)	p-value
Age	42 (34-50)	46 (38-53)	0.29
Born in Belgium	279 (85.6)	161 (86.1)	0.76
Higher education completed	266 (81.6)	150 (80.2)	0.45
Public Health Insurance	320 (98.2)	183 (97.9)	0.64
Gender: male	317 (97.2)	183 (97.9)	0.22
How many steady partners do you have?			0.55
None	162 (49.7)	93 (49.7)	
1	131 (40.2)	79 (42.2)	
2	20 (6.1)	9 (4.8)	
3	5 (1.5)	3 (1.6)	
>3	8 (2.5)	3 (1.6)	
How often did you have anal sex with your steady partner(s) in the last 3 months?*			0.25
Daily	6 (4.9)	1 (1.4)	
Weekly	64 (52.9)	35 (50.7)	
Monthly	42 (34.7)	26 (37.7)	
Less than monthly	9 (7.4)	7 (10.1	
How many occasional partners do you have?			0.64
none	38 (11.7)	20 (10.7)	
1-5	158 (48.5)	89 (47.6)	
6-10	54 (16.6)	35 (18.7)	
>10	76 (23.3)	43 (23.0)	
How often did you have anal sex with your occasional partner(s) in the last 3 months?†			0.39
Daily	3 (1.1)	0 (0.0)	
Weekly	101 (38.7)	59 (38.8)	
Monthly	111 (42.5)	63 (41.4)	
Less than monthly	46 (17.6)	30 (19.7)	
In the last 3 months, with how many anonymous or new sex partner(s) did you have sex ?			0.08
none	75 (23.0)	38 (20.3)	
1-15	210 (64.4)	125 (66.8)	
16-30	29 (8.9)	18 (9.6)	

31-50	8 (2.5)	6 (3.2)	
>50	4 (1.2)	0 (0.0)	
How often did you have anal sex with your anonymous partner(s) in the last 3 months?‡			0.13
Daily	2 (0.9)	0 (0.0)	
Weekly	74 (33.0)	39 (28.9)	
Monthly	92 (41.1)	59 (47.2)	
Less than monthly	56 (25.0)	37 (29.6)	

*only among respondents who reported anal sex with a steady partner (N=121/N=69 among participants of the baseline and follow-up questionnaires respectively)
†only among respondents who reported anal sex with an occasional partner (N=261/N=152 among participants of the baseline and follow-up questionnaires respectively)
‡only among respondents who reported anal sex with an anonymous partner (N=224/N=135 among participants of the baseline and follow-up questionnaires respectively)

407

408 **Table 2 – Baseline questionnaire questions regarding chemsex**

	Baseline questionnaire participants (N=326, n(%))
In the last three months, how much of the sex you've had has been under the influence of stimulant drugs?	
All of it	8 (2.5)
Almost all of it	26 (8.0)
More than half	14 (4.3)
About half	21 (6.4)
Less than half	17 (5.2)
Almost none of it	33 (10.1)
None of it	207 (63.5)
For how long have you been combining stimulant drugs and sex?*	
Less than 6 months	9 (7.6)
Less than 1 year	12 (10.1)
Less than 2 years	23 (19.3)
Less than 3 years	18 (15.1)
Less than 4 years	9 (7.6)
Less than 5 years	15 (15.6)
More than 5 years	33 (27.7)
Would you be willing to reduce the risks that accompany chemsex?*	
Certainly, yes	28 (23.5)
Rather yes	31 (26.1)
Rather not	50 (42.0)
Certainly not	10 (8.4)
What would help you to reduce your risks that accompany chemsex?†	
Face-to-face counselling with health professional	18 (30.5)
Group counselling	4 (6.8)
Peer support	16 (27.1)
Online training	17 (28.8)
Online support via an app	22 (37.3)

* Question asked to participants who reported engagement in chemsex in the previous 3 months (N=119)

† Question asked to participants who reported willing to reduce the risks that accompany chemsex (“certainly, yes” and “rather yes”, N=59

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411 **Table 3 – Follow-up questionnaire questions regarding chemsex**

	Follow-up questionnaire participants (N=187, n(%))
How often were you under the influence of stimulant drugs during sex (=chemsex) in the past 6 months?	
Never	133 (65.8)
Almost never	20 (10.7)
Less than half	7 (3.7)
About half of it	10 (5.3)
More than half	8 (4.3)
Almost always	17 (9.1)
Always	2 (1.1)
How often does the use of chemsex negatively affects your health, your social life or your professional life?*	
Never	30 (46.9)
More not than yes	19 (29.7)
Sometimes yes, sometimes no	15 (23.4)
More yes than not	0 (0)
Every time	0 (0)
How concerned are you that chemsex could have more negative consequences for you in the future?*	
Not concerned at all	13 (20.3)
Not concerned	15 (23.4)
Neutral	21 (32.8)
Concerned	14 (21.9)
Very concerned	1 (1.6)
To what extent would you like to have less or stop chemsex?*	
Extremely unlikely	4 (6.2)
Unlikely	13 (20.3)
Neutral	33 (51.6)
Likely	12 (18.8)
Extremely likely	2 (3.1)

* Questions asked to participants having reported chemsex (N=64)

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Appendix 1 – survey questions related to drug use and chemsex use

Baseline questionnaire

- In the last three months, how much of the sex you've had has been under the influence of stimulant drugs?
    - None of it
    - Almost none of it
    - Less than half
    - About half
    - More than half
    - Almost all of it
    - All of it
- For how long have you been combining stimulant drugs and sex?
    - Less than 6 months
    - Less than one year
    - Less than two years
    - Less than three years
    - Less than four years
    - Less than five years
    - More than five years
- Would you be willing to reduce the risks that accompany chemsex? Chemsex involves using drugs to enhance sex, often by increasing desire and reducing inhibitions. The three main drugs used for chemsex are GHB, mephedrone and crystal meth.
    - Certainly, yes
    - Rather yes
    - Rather not
    - Certainly not

- What would help you to reduce your risks that accompany chemsex? (Tick all that apply)
    - Face-to-face counselling with health professional
    - Group counselling
    - Peer support
    - Online training
    - Online support via an app
    - Other (Please specify)

Second follow-up questionnaire

- How often were you under the influence of stimulant drugs during sex (=chemsex) in the past 6 months?
    - Never
    - Almost never
    - Less than half
    - About half of it
    - More than half
    - Almost always
    - Always
- How often does the use of chemsex negatively affects your health, your social life or your professional life?
    - Never
    - More not than yes
    - Sometimes yes, sometimes no
    - More yes than not
    - Every time
- How concerned are you that chemsex could have more negative consequences for you in the future?

    - Not concerned at all
    - Not concerned
    - Neutral
    - Concerned
    - Very concerned
- To what extent would you like to have less or stop chemsex?
    - Extremely unlikely
    - Unlikely
    - Neutral
    - Likely
    - Extremely likely

Would you like to see more attention given to chemsex during a PrEP consultation? Chemsex is sex under the influence of stimulant drugs

- Yes
- No