Sex, drugs and … nutrition?

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Abstract
Recreational drug use in a sexual setting, referred to as chemsex, is an emerging area of research and HIV clinicians often have patients who use these drugs. Patients report how the drugs have the potential to affect their nutritional status. A scoping review based on an acknowledged framework was conducted to collate the available evidence. This article is based on the results of the review and supported by patient reports from clinical practice. The drugs and chemsex itself can reduce oral intake whilst increasing energy expenditure over several days. Hydration status may be compromised, and a decrease in blood glucose level has been seen. The clinical impact of this is likely to depend on factors including duration and frequency of chemsex sessions and patients' baseline nutritional status. Patients who participate in chemsex should be asked about their nutrition and hydration as part of clinical care. Further research focusing on nutrition and these drugs is needed to fully understand the impact on nutritional status.

Background

Chemsex is receiving increasing attention across healthcare services, particularly within HIV care [1]. Chemsex drugs are those taken immediately before or during sexual sessions between men [2], although that is not to say that these drugs are used exclusively by men who have sex with men (MSM), or exclusively within a sexual setting [3–7]. The drugs associated with chemsex are: mephedrone, gamma hydroxybutyrate/gamma butyrolactone (GHB/GBL) and crystal methamphetamine.

According to the most recent Crime Survey for England and Wales (CSEW) 9.0% of adults aged 16–59 years had taken any recreational drug in the preceding year, which the authors estimate equates to around 3 million people [8]. This figure increases to 19.8% for those aged 16–24 [8]. The CSEW does not present the incidence of the use of all chemsex drugs but does report that 0.1% of all adults surveyed (aged 16–59 years) had used mephedrone [8].

Assessing the prevalence of chemsex is very difficult as it is a relatively new phenomenon, particularly to researchers and medical teams. It also involves the use of drugs which are illegal. The lesbian, gay, bisexual and transgender (LGBT) community has a higher incidence of recreational drug use and are more likely to use newer substances than those who are heterosexual [9]. Gaining accurate prevalence data is difficult from a community that already faces stigma and discrimination [10]. However, in a large study involving 2248 men with HIV who had had sex with other men, 51% (*n*=1138) had used recreational drugs in the preceding 3 months, of which 10% (*n*=211) had used GHB/GBL, 8% (*n*=175) methamphetamine and 7% (*n*=162) mephedrone [11].

During clinical practice, patients report that the effect of the chemsex drugs, and the practice of chemsex itself, has the potential to impact their nutritional status. To date, however, there has been no published guidance on the management of this, hence, a scoping review [12] was conducted to investigate the extent of information available. The scoping review conducted forms the basis of this current article and aims to provide an overview of the available evidence relating to the nutritional implications of chemsex for nurses working in HIV. The impact of chemsex drugs reported by patients seen in the author's clinical practice is used to support this scientific evidence; where appropriate suggestions will be made on the management of these implications.

Methodology

The scoping review was conducted following the acknowledged methodology by Arksey and O'Malley [13] using PubMed and CINHAL. Broad search terms relating to nutrition were combined with terms relating to the drugs to give 49 searches on each database, see Box 1. Titles, and subsequently abstracts, were screened against inclusion and exclusion criteria. Articles for inclusion were read and data were extracted and charted by theme. No critical appraisal of articles or synthesis of data were performed in line with the process of conducting a scoping review [13]. The present article contains selected themes from the full scoping review and experiences the author has had working with this patient group.

Box 1. Drug and nutritional search terms; each drug search term was combined with each nutritional search term

Drug search term	Nutritional search terms
Poppers	Nutrition
Mephedrone	Weight
Crystal methamphetamine	Appetite
Methamphetamine	BMI
Gamma hydroxybutyrate	Body mass index
Gamma butyrolactone	Diet
Chemsex	Food

BMI: body mass index.

Results and discussion

A total of 39 articles were included in the scoping review that contained a broad range of study designs and very heterogeneous data, which were both qualitative and quantitative. Of note, there were several studies whereby the drug use was not in the context of chemsex, these included eating disorders [4,5] and use in dance clubs [6,7].

Oral intake

One of the most commonly acknowledged impacts of these drugs is the reduction they have on appetite. All three of the chemsex drugs have an appetite suppressing effect.

The qualitative study by Reback *et al*. contained numerous quotes by people who use methamphetamine, which demonstrates the impact and duration of effect on their appetite. One study participant reported minimal food or fluid intake for up to 24 hours [14].

In people who use mephedrone, 81% (*n*=81) reported '*no appetite for food*' [15]. The authors calculated a risk profile score by asking participants to score the frequency and intensity of various effects of mephedrone on a scale of 0–3, and then multiplied these together to give a maximum risk profile score of 9. The mean score for '*no appetite for food*' was 5.3 demonstrating a relatively high risk of this occurring.

Patients in clinical practice report reduced oral intake during chemsex sessions due to the impact of the drugs; that the environment that they are in is unlikely to be conducive to eating; and that eating is a low priority.

Patients seen as part of their routine HIV review often elaborate on their oral intake. They can report that the last meal is often taken on Thursday evening should a prolonged chemsex session starting Friday evening be anticipated. They say this is particularly important if it is likely that they will have receptive anal intercourse so as to reduce the risk of needing to open their bowels during the session and to help make them feel 'cleaner'. Often there is no food intake until Monday lunchtime, due to the 'come down' effects of the drugs and an insatiable appetite has been reported during the rest of the week. This was also found in one study where 33% (*n*=33) of people using mephedrone in the context of dance club use, reported an increase in appetite following cessation of taking the drugs [15].

People taking these drugs, particularly GHB and methamphetamine are likely to experience a dry mouth [16,17]. People using methamphetamine were 7.2 times more likely to report a dry mouth whilst eating than participants in the Third National Health and Nutrition Survey; this reached statistical significance ($P<0.0001$) [17]. Nutritional intake has been shown to be affected by a dry mouth caused by various aetiologies [18] and, when combined with a reduced appetite, is likely to make food intake more difficult.

It would be unrealistic to encourage patients who participate in chemsex to aim for full nutritional intake, however, suggesting they have energy-dense snacks with them, for when they are not actively engaged in sex, may help limit the impact of these sessions. Energy-dense fluids, such as ready-to-consume over the counter nutritional supplements, may be helpful for those who experience a dry mouth whilst taking these drugs. However, the presence of divalent cations, such as magnesium, iron and calcium, in these drinks reduces the absorption of integrase inhibitors [19,20], and does not contribute to the caloric requirements of rilpivirine containing regimens [21].

Other participants in the study by Reback and colleagues demonstrated another worrying consequence of reduced oral intake; non adherence to antiretroviral medications [14]. Some reported that as the antiretroviral therapy (ART) medications needed to be taken with food, they did not take their medications as they had not eaten [14]. It is beyond the scope of this article to discuss the implications of poor adherence to ART; however, clinicians should be aware that this occurs.

Energy expenditure

As mentioned previously, these drugs are not just used within the context of chemsex, however, it is generally the most acknowledged context, particularly in patients attending sexual health services. Of the 39 articles included in the scoping review, 17 of these (43.6%) mentioned the use of these drugs in a sexual setting. These drugs have become associated with use in a sexual setting as they enhance sexual desire and facilitate extended sexual encounters which may last over several days [22].

In the study by Barker *et al*. [6], which used focus groups of men and women who had experience of taking GHB, the 'high' often included loss of inhibitions and increased feelings of sexual desire and arousal.

The energy expenditure of physical activity is measured using metabolic equivalent times (METs). One MET is the resting energy expenditure whilst sitting at rest in a chair; two METs relates to a metabolism of twice that of sitting at rest [23]. Passive sex has a MET of 1.3 whilst active vigorous sex has a MET of 2.8 [24]. Patient reports, scientific evidence and media reports demonstrate the prolonged nature of sexual encounters whilst under the influence of chemsex drugs [2,25], therefore, increased energy expenditure is likely. Patients, however, also report that during these chemsex parties, there are periods of rest and so it cannot be assumed that patients have this level of increased metabolism during the entire duration of the chemsex session.

Blood glucose levels

There is a lack of evidence regarding the effect of mephedrone or GHB/GBL on blood glucose levels, however there are data relating to the effect of crystal methamphetamine [26,27]. Both articles show that crystal methamphetamine users have lower blood glucose levels compared to controls; this reaches statistical significance ($P<0.001$ in both studies). However,

the clinical significance of this remains uncertain as both cases and controls remained normoglycaemic [28]. However, this does raise concerns for those who have insulin dependent diabetes; as discussed above, during chemsex participants often have lowered nutritional intake, erratic eating patterns and increased energy expenditure, therefore adjustment of insulin administration is likely to be required. The monitoring of capillary blood glucose levels may be difficult due to concerns of the transmission of blood-borne viruses owing to blood exposure [29]. Although it could be suggested that gloves or waterproof dressings could be used to reduce this risk, there may be concerns from the patients over perceived disclosure of HIV status by following such practices. Additionally, some of the symptoms of hypoglycaemia may also be masked by the effects of the drugs [6,15].

Patients with diabetes who take recreational drugs should be counselled on the symptoms of hypoglycaemia along with appropriate management.

Hydration

Numerous studies reported diaphoresis with the use of chemsex drugs [15,30,31], and this is frequently reported by patients in clinical practice. The frequency of occurrence reported in the retrieved studies varies greatly depending on study design and which chemsex drug is used. Up to 81% of mephedrone users experience excessive sweating [15] and it has been implicated in acute kidney injury [32].

Harm reduction websites highlight the risks of mixing alcohol with chemsex drugs and suggest they should not be taken together [33,34]. This health promotion message appears successful in people taking GHB as only 8% (*n*=4), in one study, had ever taken alcohol and GHB together [6]. However, 82% (*n*=82) of people using mephedrone also consumed alcohol [15].

Patients often report aiming to maintain their hydration status using water. However, due to the potential prolonged nature of chemsex drug use [22], with minimal food intake as discussed above, it may not be appropriate to maintain hydration using water alone. Lara *et al*. studied sweat electrolyte concentrations in marathon runners and showed that on average sweat contains 42.9 ± 18.7 mmol/L sodium, 32.2±15.6 mmol/L chloride and 6.0±0.9 mmol/L potassium with large inter-person variation [35]. Of the searches that formed part of the scoping review a comparable study in the context of chemsex was not found, however it would be expected that electrolytes would still be lost in sweat even if not to this degree. Clinically, patients have reported the symptoms of altered electrolytes including muscle cramps following extended chemsex sessions. It was suggested that they try using over the counter sports drinks as a means of hydration and on following this advice symptoms resolved. However, it should be noted that the nutritional composition varies greatly in these drinks with regard to electrolyte, vitamin and mineral content. Those containing vitamins or minerals may need to be avoided in those taking an antiretroviral regimen which contains integrase inhibitors due to the binding effect of divalent cations that reduces drug absorption [19,20], but this will depend on the brand of sports drink and quantity consumed.

With adequate separation of integrase inhibitors and divalent cations, this could be suggested as a way of managing electrolyte loss. It should be considered, however, whether the patient is likely to be able to adhere to this in the context of chemsex, given that patients report no perception of time whilst on these drugs [15].

Strengths and limitations

The strengths of the scoping review included the novel research question, the breadth of the search terms and the methodology following a well-acknowledged framework [13]. A further strength of the scoping review was that the results included quantitative data that gave an indication of the frequency and extent of the drug effects whilst the qualitative data provided elaboration on the experiences these people had of chemsex.

A limitation of the scoping review was that only one reviewer screened the articles, however, the inclusion and exclusion criteria were robust, and any doubts of article inclusion were discussed with the author's academic supervisor.

Additionally, due to the study designs of the included articles, it was difficult to delineate the effects of the different chemsex drugs. However, during these chemsex sessions, poly drug use was often evidenced by patient reports and the retrieved articles [6,11,30], therefore, the evidence from the included articles are likely to represent the experiences of those taking these drugs in this setting.

Conclusion

Chemsex drugs, and chemsex itself is likely to impact on a patients' nutritional status. The combination of reduced oral intake and increased energy expenditure may increase the effect, particularly in those who are nutritionally vulnerable. The extent of the impact is likely affected by the frequency and duration of the use of these drugs. Those who use these infrequently are less likely to be affected than those who regularly use the drugs in a chemsex setting. Due to the heterogeneity of the data it is not possible to quantify the extent of the impact, however, based on scientific evidence and patient reports, chemsex has the potential to negatively impact patients' nutritional status. Patients attending HIV appointments who participate in chemsex should be asked about the frequency and duration of their drug use and any side effects that they experience and, where appropriate, specifically asked how their participation in chemsex affects their nutritional intake. Further research with the specific objective of assessing the nutritional impact of chemsex would greatly add to the currently available evidence.

Acknowledgements

The author would like to acknowledge the guidance and support of Dr Kirsten Whitehead from the University of Nottingham for her support during the original scoping review.

Conflicts of interests

The author has declared no conflicts of interests.

References

1. McCall H, Adams N, Mason D, Willis J. What is chemsex and why does it matter? *BMJ* 2015; **351**: h5790.

2. Bourne A, Reid D, Hickson F *et al. Chemsex study: drug use in sexual settings among gay and bisexual men in Lambeth, Southwark and Lewisham*. London: Sigma Research, London School of Hygiene and Tropical Medicine, 2014. Available at: www.sigmaresearch.org.uk/chemsex (accessed June 2019).

3. Nicholson KL, Balster RL. GHB: a new and novel drug of abuse. *Drug Alcohol Depend*, 2001; **63**: 1–22.

4. García-Gómez MDC, González JO, del Barrio AG, García NA. Rhabdomyolysis and drug abuse in a patient with bulimia nervosa. *Int J Eat Disord* 2009; **42(1)**: 93–95.

5. Neale A, Abraham S, Russell J. 'Ice' use and eating disorders: A report of three cases. *Int J Eat Disord* 2009; **42(2)**: 188–191.

6. Barker JC, Harris SL, Dyer JE. Experiences of gamma hydroxybutyrate (GHB) ingestion: a focus group study. *J Psychoactive Drugs* 2007; **39(2)**: 115–129.

7. Sumnall HR, Woolfall K, Edwards S *et al*. Use, function, and subjective experiences of gamma-hydroxybutyrate (GHB). *Drug Alcohol Dependence* 2008; **92(1–3)**: 286–290.

8. McCurry J, Stubbs C, Fair A. *Drug misuse: findings from the 2017/18 Crime Survey for England and Wales: statistical bulletin 14/18*. London: Home office, 2018. Available at: assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/729249/drug-misuse-2018-hosb1418.pdf (accessed June 2019).

9. UK Drug Policy Comission. *A fresh approach to drugs*. UKDPC, 2012. Available at: www.ukdpc.org.uk/publication/a-fresh-approach/ (accessed June 2019).

10. Stewart D. A chemsex crucible: the context and controversy. *J Fam Plann Reprod Health Care* 2016; **42(4)**: 295–296.

11. Daskalopoulou M, Rodger A, Phillips AN *et al*. Recreational drug use, polydrug use, and sexual behaviour in HIV-diagnosed men who have sex with men in the UK: results from the cross-sectional ASTRA study. *Lancet HIV* 2014; **1(1)**: e22–e31.

12. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implement Sci* 2010; **5**: 69.

13. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol* 2005; **8(1)**: 19–32.

14. Reback CJ, Larkins S, Shoptaw S. Methamphetamine abuse as a barrier to HIV medication adherence among gay and bisexual men. *AIDS Care* 2003; **15(6)**: 775–785.

15. Winstock A, Mitcheson L, Ramsey J *et al*. Mephedrone: use, subjective effects and health risks. *Addiction* 2011; **106(11)**: 1991–1996.

16. Carter LP, Richards BD, Mintzer MZ, Griffiths RR. Relative abuse liability of GHB in humans: a comparison of psychomotor, subjective, and cognitive effects of supra-therapeutic doses of triazolam, pentobarbital, and GHB. *Neuropsychopharmacology* 2006; **31(11)**: 2537–2551.

17. Murphy DA, Harrell L, Fintzy R *et al*. A comparison of methamphetamine users to a matched NHANES cohort: propensity score analyses for oral health care and dental service need. *J Behav Health Serv Res* 2016; **43(4)**: 676–690.

18. Stack KM, Papas AS. Xerostomia: etiology and clinical management. *Nutr Clin Care* 2001; **4(1)**: 15–21.

19. Electronic Medicines Compendium 2018. Tivicay 10 mg film-coated tablet. EMC, 2019. Available at: www.medicines.org.uk/emc/product/5248/smpc (accessed June 2019).

20. Electronic Medicines Compendium 2018. Isentress 600 mg film-coated tablet. EMC, 2019. Available at: www.medicines.org.uk/emc/product/8436/smpc (accessed June 2019).

21. Electronic Medicines Compendium 2018. Endurant 25 mg tablets. EMC, 2019. Available at: www.medicines.org.uk/emc/product/4968/smpc (accessed June 2019).

22. Macfarlane A. Sex, Drugs and self-control: why chemsex is fast becoming a public health concern. *J Fam Plann Reprod Health Care* 2016; **42(4)**: 291–294.

23. Jetté M, Sidney K, Blümchen G. Metabolic equivalents (METS) in exercise testing, exercise prescription and evaluation of functional capacity. *Clinical Cardiology* 1990; **13(8)**: 555–565.

24. Ainsworth BE, Haskell WL, Herrmann SD *et al*. Compendium of physical activities: A second update of codes and MET values. *Medicine & Science in Sports & Exercise* 2011; **43(8)**: 1575–1581.

25. Cain M. 2015. The rise of gay 'chemsex' parties involving libido-enhancing drugs. *Independent*. 17 October 2015. Available at: www.independent.co.uk/life-style/health-and-families/features/the-rise-of-gay-chemsex-parties-involving-libido-enhancing-drugs-a6694951.html (accessed June 2019).

26. Zhang M, Lv D, Zhou W *et al*. The levels of triglyceride and total cholesterol in methamphetamine dependence. *Medicine* 2017; **96(16)**: 1–4.

27. Lv D, Zhang M, Jin X *et al*. The body mass index, blood pressure, and fasting blood glucose in patients with methamphetamine dependence. *Medicine* 2016; **95(12)**: e3152.

28. World Health Organization. *Definition and diagnosis of diabetes mellitus and intermediate hyperglycaemia; report of a WHO/IDF consultation*. Geneva: WHO, 2006. Available at: www.who.int/diabetes/publications/Definition%20and%20diagnosis%20of%20diabetes_new.pdf (accessed June 2019).

29. Centers for Disease Control and Prevention. HIV Transmission. CDC: Atlanta, 2018. Available at: www.cdc.gov/hiv/basics/transmission.html (accessed June 2019).

30. Degenhardt L, Darke S, Dillon P. GHB use among Australians: characteristics, use patterns and associated harm. *Drug Alcohol Depend* 2002; **67(1)**: 89–94.

31. He J, Xie Y, Tao J *et al*. Gender differences in sociodemographic and clinical characteristics of methamphetamine inpatients in a Chinese population. *Drug Alcohol Dependence* 2012; **130(1–3)**: 94–100.

32. McGraw M, McGraw L. Bath salts: not as harmless as they sound. *J Emerg Nurs* 2012; **38(6)**: 582–588.

33. Frank. GHB&GBL. 2019. Available at: www.talktofrank.com/drug/ghb#mixing (accessed June 2019).

34. Frank. Methamphetamine. 2019. Available at: www.talktofrank.com/drug/methamphetamine#mixing (accessed June 2019).

35. Lara B, Gallo-Salazar C, Puente C *et al*. Interindividual variability in sweat electrolyte concentration in marathoners. *J Int Soci Sports Nutr* 2016; **13**: 31.

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