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Information-seeking behaviours in Australian sexual minority men engaged in chemsex

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ABSTRACT

Introduction: Chemsex refers to using illicit substances to facilitate sexual experiences in men who have sex with men. Chemsex has been linked to significant negative impacts on psychological, social, and physical wellbeing. Little is known about information-seeking behaviours in this population. This study aims to provide an in-depth understanding of seeking and engaging with health information.

Methods: Self-identified Australian sexual minority men who engage in chemsex (N = 184) participated in an anonymous cross-sectional survey. Variables included chemsex engagement, knowledge, perception and use of harm-reduction information, and associated health and support services. Pearson correlation and ANOVAs were conducted. Wilcoxon-Signed-Rank and Friedman tests were applied to analyse the perceived trustworthiness of information sources.

Results: Chemsex represented a meaningful part of sexual events. Most participants knew where to access professional help and harm-reduction information but worried about being judged. Most did not feel comfortable discussing chemsex with health professionals except with sexual health doctors/counsellors. Few users discussed health risks with a professional. Information on chemsex was received through multiple sources with significant differences in perceived relevance and trustworthiness, with sexual health doctors/nurses ranked the most trustworthy information. Interest in non-traditional sources of information was low except for formal peer networks and anonymous personal expert advice.

Conclusion: Engagement with health professionals and harm-reduction information is limited in this population, despite high risk and potentially significant adverse health outcomes. Results suggest that new and combined approaches are necessary to reach this population, including peer support networks, anonymous personal advice and changing community attitudes towards chemsex.

1. Introduction

Most sexual minority men (*gay and bisexual men*) live healthy lives, particularly in high-income countries with high human rights standards, such as Australia. However, the current body of research indicates the presence of marked health disparities within these communities, compared with their sexual majority counterparts, particularly poorer sexual health outcomes and higher rates of harmful and/or problematic use of illicit substances. Over the last decade, studies (Bourne, Reid, Hickson, Torres-Rueda, Steinberg, et al., 2015; Bourne, Reid, Hickson, Torres-Rueda, & Weatherburn, 2015) have observed the intersection of

sexual and illicit substance use behaviours, prompting growing concern (Macfarlane, 2016; McCall, Adams, Mason, & Willis, 2015). This sex and drug use phenomenon is commonly referred to as ‘chemsex’ (often ‘party and play’ (PnP) or ‘wired sex’ in an Australian context). It is defined as intentionally engaging in sexual activities whilst under the influence of psychotropic substances (Stardust, Kolstee, Joksic, Gray, & Hannan, 2018). The injection of substances in such sexual contexts can be referred to as ‘slamming’ or ‘slamsex’ (Race, Murphy, Pienaar, & Lea, 2021).

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1.1. Chemsex – A sub-cultural phenomenon

Substances commonly used within the context of chemsex activities include mephedrone, gamma-hydroxybutyrate (GHB), gamma-butyrolactone (GBL), crystal methamphetamine, ketamine, and cocaine (Bourne, Reid, Hickson, Torres-Rueda, & Weatherburn, 2015), although those most popular can vary by country depending on prevailing drug markets and accessibility. An increasing body of evidence (Maxwell, Shahmanesh, & Gafos, 2019) demonstrates the presence of chemsex within communities of gay and bisexual men, although it should be noted that there are a few examples of chemsex within other communities such as sexual minority women or in heterosexual people (Hibbert, Porcellato, Brett, & Hope, 2019; Pirani, Lo Faro, & Tini, 2019). Sexual minority men often live in environments perceived to be homophobic (Demant, Hides, White, & Kavanagh, 2018b). These marginalising traits of a wider heterosexist society are driven by cultural and religious norms and attitudes associated with an inhibition of enjoying same-sex sexual activity. Furthermore, the community's traumata of the AIDS epidemic and its impact on gay sexuality, identity and community-internal stigmatisation of people living with HIV/AIDS further inhibited the enjoyment of same-sex sexual activity for generations of sexual minority men (Escoffier, 2011).

Motivations for chemsex can be diverse, with some research indicating it can operate as a coping mechanism, offering a substance use-enhanced social space for assisting in the reduction of inhibition and shaming of homosexual acts (V. Smith & Tasker, 2018; Weatherburn, Hickson, Reid, Torres-Rueda, & Bourne, 2017). It has also been documented how the use of drugs in sexual contexts can dramatically enhance sexual confidence, increase sex drive, as well as sexual stamina and performance, providing stronger, more intense experiences of sexual pleasure (Weatherburn et al., 2017). However, stronger feelings of intimacy and connection with sexual partners are also linked with engaging in chemsex (Milhet, Shah, Madesclaire, & Gaissad, 2019) as well as being more likely to engage in sexual activities perceived to be 'more interesting' and 'adventurous' (Stardust et al., 2018).

1.2. Prevalence of chemsex

Current research shows generally higher rates of substance use among gay and bisexual men than their heterosexual counterparts, with disparities being particularly evident for substances commonly associated with chemsex, such as crystal methamphetamine (Roxburgh, Lea, de Wit, & Degenhardt, 2016). A community-based (Clakett et al., 2018) survey reported comparatively high levels of recent (previous six months) use of these substances in gay and bisexual Australian men: 16.9% used cocaine, 13.4% used crystal methamphetamine, 11.6% reported GHB use, and 6.3% reported the use of ketamine. An international study with 35,246 men (Demant et al., 2016) showed significantly and meaningfully higher adjusted odds ratios of lifetime use of substances commonly associated with chemsex among gay and bisexual men if compared to heterosexual men with adjusted Odds Ratios as high as 3.72 for those using GHB. This is supported by data from the representative Australian National Drug Strategy Household Survey (Roxburgh et al., 2016), which reports high levels of use of chemsex substances such as methamphetamine with 9.7% of gay and bisexual men reporting using it in their lifetime compared to 2.5% among heterosexual men. Gay and bisexual men also reported using illicit substances more regularly than their heterosexual counterparts. In the broader context, the current body of literature suggests that gay men are more likely or as likely to engage in the use of illicit substances commonly used during chemsex as their bisexual peers (Demant et al., 2016). This is consistent with a recent study from Singapore (Tan et al., 2021), which found a higher engagement of gay men in chemsex compared with their bisexual counterparts (adjusted Odds Ratio: 1.73), albeit the difference found in the study was not statistically significant. Studies have shown that men who live with HIV are significantly more

likely to engage in chemsex than their HIV-negative counterparts (Clakett et al., 2018; Maxwell et al., 2019), for example, 75% of participants engaged in chemsex in a study from Greater Manchester identified themselves as living with HIV (Tomkins, Vivancos, Ward, & Kliner, 2018). A recent behavioural survey (Clakett et al., 2018) of Australian gay and bisexual men found that 'enjoying a sexual encounter' is the primary reason to use illicit substances (67.6%), with 37% engaging in sexual activity at least half the time they used these substances. The same study reports that a little less than a third used substances in the context of group sexual activity.

1.3. Health impacts associated with chemsex

While chemsex has been associated with a range of sexually and psychological affirming outcomes (such as those outlined above), a body of research has documented a range of negative psychological, social, and physical consequences. Several chemsex-related casualties have been reported, particularly due to overdosing (Bourne, Reid, Hickson, Torres-Rueda, Steinberg, et al., 2015; Hockenfull, Murphy, & Paterson, 2017; Troya, Martínez de Gándara, Ryan, Cuevas, & Pardo, 2019), with non-fatal overdosing appearing to be a significant problem with an overdose prevalence between one and ten percent depending on the specific substance used (Clakett et al., 2018; Hammoud et al., 2018). Hospitalisations occur in 1.7% and 3.1% of users depending on the substance used (Clakett et al., 2018; Ward, Thomas, Anderson, Evans, & McQuillan, 2016). Other physical health implications include dependency syndromes, accidental injuries and being generally physically unwell (Clakett et al., 2018; Maxwell et al., 2019) as well as longer-term cardiovascular and psychiatric conditions (Pollard, Nadarzynski, & Llewellyn, 2018; Ray, 2017). The prevalence of injecting drug use and needle sharing as well as a higher prevalence of high-risk sexual behaviours (anal intercourse without the use of a condom or pre-exposure prophylaxis with serodiscordant partners or those of unknown HIV status), combined with a higher likelihood of men living with HIV engaging in chemsex raises the risk for transmission of HIV and other sexually transmissible infections (STI) as well as other blood-borne viruses, particularly hepatitis C (Demant & Oviedo-Trespalacios, 2019; Maxwell et al., 2019; Pufall et al., 2016; Pufall et al., 2018; Ward et al., 2016). In a study of 742 Spanish men living with HIV (González-Baeza et al., 2018), those engaged with chemsex were, compared to those not engaging in chemsex, more likely to be diagnosed with other STIs (85% vs. 12%, $p <= 0.001$), engage in unprotected anal intercourse (85% vs. 53%, $p <= 0.001$) and more likely to report more than 20 sexual partners within a year (44% vs. 8%; $p <= 0.001$). Negotiating safer sex practices (or, more generally, consent) may be inhibited by rationalising high-risk behaviours within chemsex contexts (Bourne, Reid, Hickson, Torres Rueda, & Weatherburn, 2014; Tomkins et al., 2018).

Negative consequences for physical health also result from poly-drug use within chemsex contexts as psychotropic substances may interact with each other or with prescription medications (Sewell et al., 2017), including medications intended to treat erectile dysfunction such as Sildenafil (Demant & Oviedo-Trespalacios, 2019) and antiretroviral medications used to treat HIV (Bracchi et al., 2015).

Further, chemsex is also potentially linked to lower levels of psychological wellbeing with a higher prevalence of mental illness including depression and general social isolation (Maxwell et al., 2019; Stardust et al., 2018). It may limit social connections among users with a particularly strong negative influence on romantic relationships and connections to the LGBT community (Bourne et al., 2014; Maxwell et al., 2019; Stardust et al., 2018). Furthermore, regular use of substances in a sexual context may effectively lead a 'sexual dependency' on chemsex and inhibit long-term users from engaging in sex without the use of substances (Bourne et al., 2014).

1.4. Information-seeking behaviours and harm-reduction strategies

In the context of this study, information-seeking behaviour is defined in accordance to Davies (1976) as the purposive seeking of information; in this case concerning chemsex and chemsex-related subjects. Information-seeking behaviour includes formal and informal information sources, and encompasses the process from understanding the information needs of chemsex users to how they obtain and use said information (Julien, 1996). Studies on general health information-seeking behaviours suggests that sexual minority people are more likely to actively search for information than sexual majority people in general, while being less likely to seek information from medical doctors (Langston, Fuzzell, Lewis-Thames, Khan, & Moore, 2019). Studies also suggest that information-seeking behaviour practices among sexual minority populations may differ. A study from the US found that sexual minority African American men or trans individuals found that health information needs and practices not only differ from sexual majority populations but also from other sexual minority populations (Rose, Friedman, Spencer, Annang, & Lindley, 2016). This is consistent with the overall body of literature demonstrating different health-information needs and information-seeking practices in sexual minority subgroups (Jia, Du, & Zhao, 2021; Magee, Bigelow, DeHaan, & Mustanski, 2012).

However, little is known about information-seeking behaviours and information flows among people engaging in chemsex. The overall negative attitude towards typical substances involved in chemsex, particularly crystal methamphetamine, within the wider as well as LGBT communities creates a situation that is perceived to be judgemental towards this particular type of substance use (Ahmed et al., 2016; Lea et al., 2019). While this apparently does not prevent these men from engaging in chemsex, it may limit access to and availability of spaces for them to discuss and seek appropriate information regarding chemsex harm reduction.

As with other people or groups who use substances, there is a particular focus among chemsex-engaged health practitioners on harm-reduction strategies. However, traditional harm-reduction strategies concerning illicit substances are largely related to syringe usage, substitution therapies, and abstinence. These traditional harm-reduction strategies as well as their respective associated services and organisations, are largely targeted at those using opiates, particularly heroin. The context-specific use of substances for chemsex, as well as the diversity of substances used and the high level of interactions between users, requires a different approach. Such approaches need to recognise not only the general context in which these are used but one that also addresses and accepts users' identities as gay and bisexual men and – often – as men living with HIV and the multiply stigmatised identities within this context.

LGBTQ community organisations in Australia have implemented approaches to reach and serve men using drugs in sexual contexts. A community-led harm-reduction approach by Sydney-based community health organisation ACON (formerly the AIDS Council of New South Wales) named SAM (Sexually Adventurous Men), which was initiated to offer tailored counselling services and materials to address acute harms associated with chemsex, distributing information concerning overdoses, dependency as well as HIV/STIs in appropriate settings, such as sex-on-premises venues (Stardust et al., 2018). Thorne Harbour Health has delivered a similar program of work in the state of Victoria (Burgess, Parkhill, Wiggins, Ruth, & Stoovè, 2018) and while both show promise in terms of positive client appraisals, the extent to which they have been able to service the needs of the relatively large proportion of men engaging in chemsex is as yet unclear.

1.5. Objectives

Research is necessary to identify levels of support services knowledge and trust, and information-seeking behaviours among men

engaging in chemsex. More also needs to be understood about interactions between those engaging in chemsex, as research shows that social media and peer-education play an important role in this context, potentially resulting from the stigmatising environment. Previously stigmatised and/or novel issues were commonly associated with social media peer-education such as the community 'r/askgaybros' on social media discussion board Reddit (Dishy, 2018).

In the context of evidenced risks and documented harms, this research project aimed to identify facilitators and barriers to sex and substance use information-seeking behaviours among men who participate in chemsex. This study was undertaken with the objective of generating new knowledge regarding what makes a support, health, or information service trustworthy, safe, and useful for chemsex participants and who they turn to for information that meets these criteria. No specific sets of hypotheses were developed, and an exploratory approach to analyses was employed. This knowledge will improve current efforts to engage this group for harm reduction and improved health outcomes.

2. Methods

2.1. Participants and recruitment

Men self-identifying as engaging in chemsex participated in an anonymous cross-sectional online survey between November 2020 and January 2021. All men, regardless of sex assigned at birth, were eligible to participate in this research to ensure trans-inclusive research and to ensure that the health and trans and gender diverse members of the community is considered. All adult men living in Australia who have ever engaged in chemsex with another man were eligible to participate in the study. Recruitment was focused on online communities frequented by sexual minority men, including general social media groups, and paid advertisements on online dating apps geared toward sexual minority men. We provided participants with a brief definition of chemsex to ensure a basic shared understanding: "*Chemsex, also called Party and Play (PnP), refers to using illegal drugs including but not limited to Crystal Methamphetamine, GHB (commonly known as G) or Mephedrone to facilitate a sexual experience with other men.*" An incentive in the form of a prize draw of 20 retail vouchers valued at AU\$25 each were offered to participants. Ethical approval was granted through the University of Technology Sydney's Medical Research Ethics Committee (Approval Number: ETH20-5326). Informed consent was sought from each participant before starting the survey.

2.2. Variables

2.2.1. Chemsex behaviour

A range of variables regarding chemsex behaviour were collected: onset of involvement in chemsex (in years), last time engaged in chemsex, frequency of chemsex in the past 12 months (weekly, monthly, once or a couple of times), and the proportion of sexual events intentionally involving substance use in the past 12 months (always/almost always, most of the time, about half of the time, some of the time, almost never). Participants were requested by the system to answer all items, but were able to continue the survey without answering questions; this was the case for all items included in the survey except an item asking participants to confirm their eligibility.

2.2.2. Knowledge, perception and use of health and other support services

Participants were asked about their knowledge of support services (e.g., I would know where to go for professional help in managing chemsex if I needed to) on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). They were also asked about their perception and use of a range of health services and health professionals (e.g., sexual health doctors, family doctors, community health workers) across three domains: 'I would feel comfortable discussing chemsex with [...]', 'I have discussed chemsex with [...]' and 'I received the information I was looking for

from [...]. The survey separately inquired about the perception of chemsex information from different sources, including professional sources (e.g., community organisations), private sources (e.g., friends and sex partners) as well as online communities; variables here included 'ever received information on chemsex or drug use' and 'relevance of information' (Likert-scale from 1, not relevant at all, to 10, highly relevant). Finally, participants were asked to rank the trustworthiness of information by source (e.g., sexual health nurse).

In the last step, participants were asked about their likelihood to seek information from a range of non-traditional ways to convey information on chemsex such as peer-led workshops or formal peer-support networks on a Likert scale from 1 (very unlikely) to 10 (very likely).

2.2.3. Demographics and control variables

Demographic information on sexual orientation, sex assigned at birth, ethnicity, country or region of birth, time spent in Australia and relationship status were collected (see Table 1). The LGBT Community Connectedness Scale has been used to assess participants connectedness to the LGBT community (Demant, Hides, White, & Kavanagh, 2018a), consisting of eight statements (e.g., you are proud of the LGBT Community) rated on a Likert scale from 1 (agree strongly) to 4 (disagree strongly). We also enquired about the use of substances commonly associated with chemsex in the past 12 months: Poppers (slang term referring to substances containing alkyl nitrites; Demant and Oviedo-Trespalacios (2019), MDMA (ecstasy; Methylendioxyamphetamine), GHB/GBL (gamma-Hydroxybutyric acid/gamma-butyrolactone), LSD (lysergic acid diethylamide), ketamine, cocaine, methamphetamine, mephedrone, and heroin.

Psychological distress has been evaluated with the widely used Kessler-10 Psychological Distress Scale (K10; Kessler et al. (2002); the K10 consists of ten items asking about psychological distress in the past month with each item rated on a 5-point Likert scale from 1 (all of the

time) to 5 (none of the time). In primary care settings, values above 16 suggest some level of psychological distress (Andrews & Slade, 2001). Finally, resilience was assessed using the Brief Resilience Scale (B. W. Smith et al., 2008) with five items rated on a Likert-scale from 1 (strongly disagree) to 5 (strongly agree). Scores were averaged across the items with scores between 1.00 and 2.99 suggesting low resilience, scores from 3.00 to 4.30 suggesting normal resilience, and values between 4.31 and 5.00 suggesting a high level of resilience.

2.3. Statistical analysis

All analyses were conducted in IBM SPSS Statistics v27. Frequencies and percentages were generated for categorical variables; means with standard deviations were generated for continuous variables. Pearson correlation, fixed-effect One-Way Analyses of Variance (ANOVA), t-tests and Mann-Whitney U tests were applied to continuous variables. Assumptions of all tests were checked. Normality was checked visually for Pearson correlations and ANOVAs using histograms and were log-transformed if the normality assumption was violated. Normality distribution in groups for t-test was checked using the Shapiro-Wilk test, and the Mann-Whitney U test was used if the assumption was violated. Levene's test was used to test for homogeneity of variances and equal variances assumptions of ANOVAs were adjusted accordingly. Tukey's Honest Significance Difference test was used as a post-hoc test for all ANOVAs if applicable. Wilcoxon Signed-Rank and Friedman tests were applied to rank and analyse data on perceived trustworthiness of information by source type.

Statistical significance was interpreted to be present using the standard $\alpha = 0.05$ cut-off. The internal consistency of included scales has been examined using Cronbach's alpha. All scales have demonstrated good to excellent levels of internal consistency (Tavakol & Dennick, 2011), with Cronbach's Alpha values of 0.85 or higher in this sample.

Data from participants with missing values on key variables (age, frequency and proportion of chemsex) were excluded from the analysis ($n = 39$); most of these dropped out immediately after, consistent with 35 not answering any question. Furthermore, participants who dropped out without providing data on knowledge, perception and use of health and other support services were excluded from the analysis ($n = 27$).

3. Results

3.1. Participants

A total of 251 men consented to participate in the study with a median completion time of 11 min (IQR: 4.66 – 18.5). After data cleaning, the final sample consisted of 184 men (see Table 1) with a mean age of 38.8 ($SD = 11.2$). The vast majority of participants identified as White (78.3%, $n = 144$) and gay (81.5%, $n = 150$), and 73.3% ($n = 132$) were born in Australia. Most participants (62.1%, $n = 113$) were not in a relationship. Participants showed a moderate connectedness to the LGBT community with a mean score of 22.1 ($SD: 6.1$) on a scale of 8 – 32 or 59%. The mean K10 score across the sample was 22.2 ($SD = 9.1$), indicating a moderate-to-high level of psychological distress in the overall sample. The mean Brief Resilience Score in the sample was 3.3 ($SD = 0.9$).

3.2. Engagement in chemsex and related substance use

3.2.1. Chemsex engagement

Table 2 outlines basic chemsex engagement characteristics in the sample. Most participants (54.5%; $n = 99$) started engaging in chemsex more than five years ago, followed by 24.7% ($n = 45$) starting with chemsex within the last two years, while a fifth (20.7%, $n = 45$) started within the last three to five years. About two-thirds of participants (65.9%, $n = 120$) have engaged in chemsex in the past three months before completing the survey, with about half the sample engaging in

Table 1
Demographics (N = 184).

Age, mean (SD)		38.8 (11.2)
Ethnicity, % (n)	White	78.3% (n = 144)
	Asian	9.2% (n = 17)
	Arab/Middle-Eastern	4.3% (n = 4)
	Indigenous	1.6% (n = 3)
	Other	4.9% (n = 9)
Assigned Male at Birth, % (n)		100% (n = 184)
Sexual Orientation, % (n)	Gay	81.5% (n = 150)
	Bisexual	13.6% (n = 25)
	Queer/Pansexual/Other	4.9% (n = 9)
Country/Region of Birth, % (n)	Australia	73.3% (n = 132)
	New Zealand	5.6% (n = 10)
	Asia	9.4% (n = 17)
	Europe	6.1% (n = 11)
	Middle East	2.2% (n = 4)
	Africa	2.2% (n = 4)
	South America	1.7% (n = 3)
	Living in Australia more than 5 years of those not born in Australia, % (n)	
Relationship status, % (n)	No relationship	62.1% (n = 113)
	Relationship with one regular partner	28.0% (n = 51)
	Relationship with more than one regular partner	9.9% (n = 18)
LGBT Community Connectedness Scale, mean (SD)		22.1 (6.1)
Psychological Distress Scale (Kessler-10), mean (SD)		22.2 (9.1)
Brief Resilience Scale, mean (SD)		3.3 (0.9)

Table 2
Chemsex Engagement.

Started with chemsex, % (n)	Past 2 years	24.7% (n = 45)
	3 – 5 years ago	20.8% (n = 38)
	More than 5 years ago	54.5% (n = 99)
Last time engaged in chemsex, % (n)	Past three months	65.9% (n = 120)
	More than three, less than six months	7.7% (n = 14)
	More than six, less than 12 months	11.5% (n = 21)
	More than 12 months	4.8% (n = 27)
Frequency of chemsex past 12 months, % (n)	Weekly	21.1% (n = 32)
	Monthly	31.6% (n = 48)
	Once or couple of times	47.4% (n = 72)
Session lasting longer than 12 h, past 12 months, % (n)	Yes	51.0% (n = 78)
	No/Unsure	49.0% (n = 75)
Proportion of sexual events intentionally involving substance use, past 12 months, % (n)	Always/almost always	19.7% (n = 30)
	Most of the time	18.4% (n = 28)
	About half the time	15.1% (n = 23)
	Some of the time	35.5% (n = 54)
	Almost never	11.2% (n = 17)
Overdosed during chemsex, % (n)	Yes, in the past 12 months	11.9% (n = 21)
	Yes, but not in the past 12 months	10.2% (n = 18)

chemsex on a weekly (21.1%, $n = 32$) or monthly ($n = 31.6\%$, $n = 48$) basis, while the other half of participants (47.4%, $n = 72$) engaged in chemsex one or a couple of times over the past 12 months. Similarly, approximately half (51.0%, $n = 78$) the sample engaged in a chemsex session in the past 12 months that lasted longer than 12 h. Almost 40% of participants stated that chemsex represents (almost) all (19.7%, $n = 30$) or most (18.4%, $n = 28$) of their sexual events in the past 12 months, while 15.1% ($n = 23$) engage in it about half the time, with 35.5% ($n = 54$) stating some of the time followed by just over ten per cent (11.2%, $n = 17$) stating almost never. More than a fifth of participants overdose at some point during chemsex, with 11.9% ($n = 21$) having experienced an overdose in the past 12 months.

3.2.2. Engagement in substance use

Only 4.3% ($n = 8$) participants did not use any of the nine substances commonly associated with chemsex in the past 12 months with mean of 3.5 ($SD = 2.0$) substances used in the past 12 months in the sample (see

Table 3
Illicit Substance Use (past 12 months).

Substance	Used in past 12 months, % (n)
Poppers	85.9% ($n = 158$)
MDMA	52.2% ($n = 96$)
GHB/GBL	49.5% ($n = 91$)
LSD	17.9% ($n = 33$)
Ketamine	26.6% ($n = 49$)
Cocaine	41.3% ($n = 76$)
Methamphetamine	66.8% ($n = 123$)
Mephedrone	3.3% ($n = 6$)
Heroin	2.2% ($n = 4$)
Any of the above substances	95.7% ($n = 176$)

Table 3). The most commonly used drugs (see Table 3) were poppers (85.9%, $n = 158$), followed by methamphetamine (66.8%, $n = 123$), MDMA (52.2%, $n = 96$), GHB/GBL (49.5%, $n = 91$), cocaine (41.3%, $n = 76$), ketamine (26.6%, $n = 49$) and LSD (17.9%, $n = 33$). Few participants used mephedrone (3.3%, $n = 6$) or heroin (2.2%, $n = 4$)

3.3. Information-seeking behaviour and perception of health and other support services

3.3.1. Support services knowledge

Most people ($M = 3.9$, $SD = 1.3$) agreed that they knew where they could receive professional help in managing their chemsex (see Table 4). Participants similarly knew ($M = 3.9$, $SD = 1.3$) where to access relevant harm reduction information. However, a meaningful part ($M = 3.5$, $SD = 1.4$) of the sample worried about being judged by health professionals for their engagement in chemsex. Those who worried about their engagement in chemsex were less likely to know where to go to for professional help ($r(154) = -0.181$, $p = 0.024$) and were also less likely to know how to access harm reduction information ($r(154) = -0.159$, $p = 0.047$). No significant differences were detected between frequency and proportion of chemsex, and support services knowledge. Similarly, no differences were detected between sexual orientations (gay vs others) and support services knowledge.

Few differences were found for these variables by the types of substances used. Those who did not use poppers were more likely to know where to access harm reduction information about chemsex than those who use poppers ($U = 1008.0$; $p = 0.049$). Participants who used Ketamine were more likely to know where to go for professional help to manage their chemsex if needed ($U = 1896.0$; $p = 0.024$). Finally, participants who use methamphetamine were more likely to worry about being judged by a health professional for engaging in chemsex than those who did not use this substance ($U = 1927.0$; $p = 0.035$), while people who use cocaine were less worried about being judged than those to used cocaine ($U = 2364.0$; $p = 0.04$).

3.3.2. Perception and use of health services

Overall, a meaningful number of participants did not feel comfortable discussing their engagement in chemsex with most health professionals (see Table 5). More than half of participants would feel comfortable discussing their chemsex engagement with only two groups of health professionals: sexual health doctors (59.2%, $n = 109$) and sexual health counsellors (52.7%, $n = 97$). This is followed by sexual health nurses (45.7%, $n = 84$) and health workers from LGBT community organisations (44.0%, $n = 81$). Only about a third would feel comfortable discussing their chemsex engagement with general counsellors and family doctors/general practitioners with 35.9% ($n = 66$) and 34.2% ($n = 63$), respectively.

A small number of participants have actually discussed their engagement in chemsex with any health professional (see Table 5), with 27.7% ($n = 51$) discussing with a sexual health doctor followed by their family doctor/general practitioner (24.5%, $n = 45$) and sexual health nurses (21.7%, $n = 40$). Less than 20% discussed their chemsex engagement with general (17.4%, $n = 32$) and sexual health counsellors (12.5%, $n = 23$) or health workers from LGBT community organisations (14.7%, $n = 27$). However, of those who discussed chemsex with any health professionals, 60% or more received the information they were looking for, with three-quarters or more receiving the information they were looking for from sexual health nurses (79.5%, $n = 31$), sexual health doctors (76.6%, $n = 36$), and their family doctor/general practitioner (75.6%, $n = 31$). Information received from health workers from LGBT community organisations, and general counsellors were perceived as less relevant with 65.4% ($n = 17$) and 60.0% ($n = 18$), respectively.

3.3.3. Relevance and distribution of chemsex information

Participants have received information from a range of formal and informal sources (see Table 6), with many participants reporting to have

Table 4
Support Services Knowledge, mean (SD).

Statement	Agreement#	Correlation [^]			ANOVA&	
		(1)	(2)	(3)	Frequency of Chemsex	Proportion of Chemsex
(1) I would know where to go for professional help in managing chemsex if I needed to. (n = 158)	3.9 (1.3)	n/a	r = 0.799, n = 156, p ≤ 0.001	r = -0.181, n = 156, p = 0.024	F(2,130) = 0.500; p = 0.608	F(4,128) = 1.024; p = 0.397
(2) I would know where to access harm reduction information about chemsex if I needed to. (n = 156)	3.9 (1.3)	r = 0.799, n = 156, p ≤ 0.001	n/a	r = -0.159, n = 156, p = 0.047	F(2,128) = 0.432; p = 0.650	F(4,126) = 1.177; p = 0.324
(3) I worry that I am being judged by health professionals for engaging in chemsex. (n = 156)	3.5 (1.4)	r = -0.181, n = 156, p = 0.024	r = -0.159, n = 156, p = 0.047	n/a	F(2,128) = 0.468; p = 0.628	F(4,126) = 0.377; p = 0.825

#Likert-scale from 1 (strongly disagree) to 5 (strongly agree); [^] Pearson Correlation, & Analysis of Variance.

Table 5
Perception and Use of Health Services.

	I would feel comfortable discussing chemsex with...	I have discussed chemsex with...	I received all information I was looking for...#
Sexual health doctor	59.2% (n = 109)	27.7% (n = 51)	76.6% (n = 36)
Sexual health nurse	45.7% (n = 84)	21.7% (n = 40)	79.5% (n = 31)
Counsellor (general)	35.9% (n = 66)	17.4% (n = 32)	60.0% (n = 18)
Sexual health counsellor	52.7% (n = 97)	12.5% (n = 23)	77.3% (n = 17)
Community health worker (LGBT organisation)	44.0% (n = 81)	14.7% (n = 27)	65.4% (n = 17)
Family doctor/general practitioner	34.2% (n = 63)	24.5% (n = 45)	75.6% (n = 31)

of those who discussed chemsex with the health professional.

received information on chemsex through friends (33.2%, n = 61), casual sex partners (32.1%, n = 59), strangers on hook-up apps (26.1%, n = 48), online communities (25.0%, n = 46) and regular sexual or romantic partners (22.8%, n = 42). Almost one-third (29.9%, n = 55) received information through community organisations, with less than ten per cent (9.2%, n = 17) having received information through other community organisations. The relevance of information was overall perceived fairly similar with only minor differences between sources. However, information received from LGBT community organisation was perceived the most relevant ($M = 7.9$, $SD = 2.3$) while information received from online community and strangers on hook-up apps were perceived to be the least relevant with mean scores of 7.1 ($SD = 2.5$) and

Table 6
Distribution and perception of chemsex information.

	Ever received information on chemsex or drug use	Relevance of information#	Correlation between relevance of information and frequency of chemsex [^]	Correlation between relevance of information and proportion of chemsex&
LGBT + community organisation	29.9% (n = 55)	7.9 (2.3)	F(2,46) = 0.488; p = 0.617	F(4,44) = 1.475; p = 0.226
Other community organisation	9.2% (n = 17)	7.5 (2.4)	F(2,13) = 0.869; p = 0.442	F(3,12) = 2.143; p = 0.148
Casual sexual partner	32.1% (n = 59)	7.3 (2.1)	F(2,48) = 1.531; p = 0.227	F(4,46) = 2.314; p = 0.072
Regular sexual or romantic partner	22.8% (n = 42)	7.7 (2.1)	F(2,35) = 0.624; p = 0.542	F(4,33) = 0.481; p = 0.749
Friends	33.2% (n = 61)	7.2 (2.3)	F(2,49) = 0.055; p = 0.946	F(4,48) = 1.260; p = 0.299
Online communities (e.g., reddit)	25.0% (n = 46)	7.1 (2.5)	F(2,35) = 0.038; p = 0.963	F(4,33) = 1.372; p = 0.265
Strangers on hook-up apps (e.g., Grindr)	26.1% (n = 48)	6.6 (2.4)	F(2,38) = 0.094; p = 0.910	F(4,36) = 0.908; p = 0.469

Likert-Scale from 1 (not relevant at all) to 10 (highly relevant); [^] Analysis of Variance - Frequency of Chemsex in the past 12 months (weekly, monthly, once or a couple of times); & Analysis of Variance - Proportion of sexual events intentionally involving substance use in the past 12 months (always/almost always, most of the time, some of the time, almost never).

6.6 ($SD = 2.4$), respectively. No significant correlations were found between perception of the relevance of information and frequency or proportion of chemsex. No differences in the perceived relevance were found by substance used except for participants who used ketamine. These participants were more likely to perceive the information from LGBT + community organisations ($U = 223.5$, $p = 0.023$), other community organisations ($U = 13.0$; $p = 0.024$), casual sex partners ($U = 198.0$; $p = 0.005$), and regular sexual and romantic partners ($U = 115.5$; $p = 0.021$) as helpful compared to those who did not use ketamine. Similarly, only one difference was found by different sexual orientations with gay men finding information received through online communities to be more relevant than men of other sexual orientations ($U = 120.0$; $p = 0.033$).

We also asked participants to rank potential sources of information by their trustworthiness (see Table 7) with significant differences between sources in general ($\chi^2(154) = 372.249$, $p \leq 0.001$) and between almost all individual sources. Overall, participants perceived professional sources including sexual health doctors, substance use and LGBT community organisations as well as GPs and family doctors to be more trustworthy than sexual partners, friends, and online communities as well as information obtained through government departments and organisations. However, sexual health doctors and nurses were ranked as the most trustworthy sources of information with a mean rank of 2.4 ($SD = 1.4$). They were the only source of information perceived to be significantly more trustworthy than any other source. This was followed by substance use ($M = 3.4$, $SD = 1.7$) and LGBT community organisations ($M = 3.6$, $SD = 1.8$), general practitioners/family doctors ($M = 3.6$, $SD = 2.1$), sexual partners ($M = 5.3$, $SD = 1.9$), friends ($M = 5.4$, $SD = 1.9$), governmental departments or organisations ($M = 6.0$, $SD = 2.1$), and online community forums and boards ($M = 6.4$, $SD = 1.8$).

Finally, we presented participants with a list of five potential (non-traditional) sources of information and asked about their likelihood to participate in taking up these offers (see Table 8). Only two sources of

Table 7
Perceived trustworthiness of information by source

Source	Mean rank (SD)	Test statistics (Friedman test)	Sig.#	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Sexual health doctor or nurse	2.4 (1.4)	$\chi^2(154) = 372.249, p \leq 0.001$	(1)	n/a	***	***	***	***	***	***	***
(2) Substance use organisations	3.4 (1.7)		(2)	***	n/a	ns	ns	***	***	***	***
(3) LGBT community organisation	3.6 (1.8)		(3)	***	ns	n/a	ns	***	***	***	***
(4) General practitioner/Family doctor	3.6 (2.1)		(4)	***	ns	ns	n/a	***	***	***	***
(5) Sexual partners	5.3 (1.9)		(5)	***	***	***	***	n/a	ns	*	***
(6) Friends	5.4 (1.9)		(6)	***	***	***	***	ns	n/a	*	***
(7) Governmental departments/organisations	6.0 (2.1)		(7)	***	***	***	***	*	*	n/a	ns
(8) Online community forums and board	6.4 (1.8)		(8)	***	***	***	***	***	***	ns	n/a

#Wilcoxon Signed-Rank test. ns – not significant, n/a – not applicable * $p \leq 0.05$, ** $p \leq 0.01$, $p \leq 0.001$.

information were likely to be picked up by participants: formal peer networks established through organisations (51.4%, $n = 74$; $M = 5.5$, $SD = 2.9$) and anonymous personal expert advice (53.5%, $n = 77$; $M = 5.8$, $SD = 2.32$). Almost half would also consider participating in non-formal support networks such as online communities (49.0%, $n = 74$; $M = 5.3$, $SD = 3.2$). Participants have shown lower levels of interest in public information sessions (33.8%, $n = 48$; $M = 3.7$, $SD = 3.0$) and peer-led workshops (30.8%, $n = 44$; $M = 4.1$, $SD = 3.0$).

The likelihood of participating in these was not related to resilience, psychological distress, drug-taking confidence, age or level of engagement in chemsex (frequency and proportion of chemsex). However, LGBT community connectedness was correlated with three items with higher levels of community connectedness being linked to a higher likelihood to participate in formal ($r(141) = 0.318, p \leq 0.001$) and non-formal ($r(148) = 0.164, p = 0.045$) peer networks and participation in peer-led workshops ($r(140) = 0.279, p = 0.001$). Similarly, very few differences were found between participants who used and those who did not use certain substances. Participants use used poppers were more likely to seek information from formal peer-support networks ($U = 750.5$; $p = 0.040$) and less likely to seek anonymous personal expert advice ($U = 787.0$; $p = 0.034$) than those who did not use poppers. Methamphetamine users were more likely to seek information through peer-led workshops than those who did not use this substance ($U = 1697.0$; $p = 0.032$) whereas heroin users were less likely to seek information through peer-led workshops than those who do not use heroin ($U = 64.5$; $p = 0.037$). No differences between sexual orientations were detected.

4. Discussion and conclusion

The findings of this study showed that most men had been engaging in chemsex over a long-term period of up to five years or more. Not only did their participation indicate a relatively long-term commitment, but it was performed frequently, with just over half the sample engaging in chemsex on a weekly or monthly basis. These findings concur with research that has reported on its appeal for some men in the LGBTQ community for reasons of security, inclusivity, and enhanced sexual pleasure (Weatherburn et al., 2017). Data showing that these men are frequent participants and ‘return-visitors’ over sustained periods demonstrates that the group are regular substance-users, as well as potentially engaging quite often in potentially risky sexual behaviours. This identifies them as a target group needing close attention and contextually sensitive responses from healthcare providers and health promotion workers and organisations. Specifically, the findings showed that 11.9% had experienced an overdose within the past 12 months. This finding sits in accordance with previous research showing that non-fatal overdoses in this group remains an ongoing occurrence and health problem for some men engaging in chemsex (Clakett et al., 2018; Hammoud et al., 2018; Soria, 2021).

Minimal research has been undertaken to understand information-seeking behaviours in men who engage in chemsex. While the body of research on this phenomenon increases more generally, most research in this space is still limited to studies concerned with understanding the extent and health-impact of these behaviours (Maxwell et al., 2019). Research in the past focussing on information-seeking behaviours in sexual minority populations exist, particularly in sexual health; however, it is unclear if the findings of these studies are transferable to

Table 8
Likelihood and Correlations of Information-Seeking by Source of Information;

Source of information	Agree, % (n)#	Mean agreement (SD)*	Correlations&					Correlations*	
			LGBT Community Connectedness Scale	Brief Resilience Scale	Psychological Distress Scale (Kessler-10)	Drug-Taking Confidence Questionnaire	Age	Frequency of chemsex	Proportion of chemsex
Non-formal peer-support networks (e.g., online communities)	49.0% (n = 74)	5.3 (3.2)	$r = 0.164, n = 150, p = 0.045$	ns	ns	ns	ns	$F(2,124) = 1.809; p = 0.168$	$F(4,123) = 1.120; p = 0.350$
Formal peer-support networks (e.g., established through community organisations)	51.4% (n = 74)	5.5 (2.9)	$r = 0.318, n = 143, p \leq 0.001$	ns	ns	ns	ns	$F(2,119) = 1.035; p = 0.358$	$F(4,118) = 1.934; p = 0.109$
Anonymous personal expert advice	53.5% (n = 77)	5.8 (3.2)	ns	ns	ns	ns	ns	$F(2,118) = 0.512; p = 0.600$	$F(4,117) = 0.479; p = 0.751$
Public information sessions	33.8% (n = 48)	3.7 (3.0)	ns	ns	ns	ns	ns	$F(2,118) = 2.015; p = 0.138$	$F(4,117) = 0.653; p = 0.626$
Peer-led workshops	30.8% (n = 44)	4.1 (3.0)	$r = 0.279, n = 142, p = 0.001$	ns	ns	ns	ns	$F(2,118) = 2.622; p = 0.077$	$F(4,117) = 1.661; p = 0.0164$

- defined as scoring 6 to 10 on a ^ Likert scale from 1 (very unlikely) to 10 (very likely); & Pearson Correlation, ns – not significant; * Analysis of Variance.

chemsex.

Regarding information-seeking behaviour and perception of health and other support services, a significant portion of the sample felt that they would be poorly judged by traditional or general healthcare providers for their involvement in chemsex. This is a well-established concern for gay and bisexual men in terms of general health care provision, wherein patients are reluctant to share information with physicians, nurses, and community organisation workers on sensitive issues or problems that might generate an undesirable response, such as negative moral judgement, or inappropriate or insensitive treatment, or interventions (Jaspal, 2020; van Boekel, Brouwers, van Weeghel, & Garretsen, 2013). This can include a range of social, behavioural, and health problems pertaining to sexual minority communities, and has been established in the literature to span issues such as domestic and family violence, drug and alcohol use, self-harm, and disordered eating (Hill, 2010). Our research shows that chemsex is yet another socially sensitive issue, about which patients are wary of disclosing to their healthcare providers, thereby reducing their chances of gaining access to relevant information and interventions. This reluctance emerged as specifically problematic in this study, as those who were hesitant to discuss chemsex with healthcare providers knew less about where to access professional help and harm reduction information.

The majority of participants expressed that if they did discuss their engagement in chemsex with health professionals, they would prefer to select sexual health specialists, specifically doctors and nurses in this field. While a majority expressed that they would hypothetically discuss chemsex with sexual health specialists, only a small sample had actually done so with any health professional at all. Those who had done so, had gone to sexual health doctors, their family, doctors and sexual health nurses. A very low percentage had gone to counsellors of any kind for this type of support and information, nor had they gone to LGBT community organisations (although it should be noted that these are small-scale and exist only in major urban centres). Overall, 60% of participants found the health information and assistance they were looking for, but three quarters of this information came from sexual health doctors and nurses, and general practitioners.

This finding has implications that are twofold. Firstly, while two thirds of participants found what they were looking for, one third did not. Further research is needed to understand what needs are not being met, and what this missing information and assistance could look like. It is crucial to understand where health and community services are not equipped to assist men partaking in chemsex with their health information-seeking behaviours. Previous research also identified that perceived stigma related to chemsex and internalised homonegativity may impact on information and help-seeking behaviours in this population (Hibbert et al., 2021). Secondly, it appears that parts of this group currently do not necessarily perceive counsellors and LGBT organisations to be the 'go-to places' for health-based information and assistance. Additionally, when they do, they were less likely to find what they were looking for than if they visited sexual health doctors and nurses. This current service gap needs to be evaluated further to better understand which processes need to be in place for community organisations to better meet the need of this group with the resources available to them in their respective circumstances. These results are interesting and to an extent inconsistent with the current body of literature showing that sexual minority people are generally more likely to actively seek-out health information but commonly less likely to do so from medical doctors (Langston et al., 2019). It is likely that the complexity of chemsex as a practice that impacts on sexual, physical, social, and emotional health (Bohn et al., 2020) increases the likelihood of those engaged in it to prefer information from specialised medical practitioners and nurses. This is consistent with a 2018 study from the United Kingdom showing a high demand for specialist chemsex services in sexual health clinics (Wiggins et al., 2018).

Regarding relevance and distribution of health information, most participants reported receiving this from friends, casual partners, and

strangers on hook-up apps, or online communities. Although less than ten percent of the group reported receiving information from community organisations, the information gained from these organisations, and from LGBT organisations in particular were perceived as most relevant. This discrepancy between where men are sourcing information, and where the information they actually find relevant is located is of significance for public health and education experts. This was congruent with the findings on the trustworthiness of the information, wherein the informal networks of participants were perceived as far less reliable than any of the professional health services. However, as with trends in service use, trustworthiness was highest amongst sexual health doctors and nurses, as well as general practitioners. Few differences between types of substances and sexual orientations were found. These differences did not form an obvious pattern.

Finally, the participants rated their likelihood to engage in five potential informal activities to gain health-related information. Participants said they were only likely to select formal peer networks and anonymous personal expert advice, and half would consider non-formal support such as online communities. Such peer-based approaches may be a chance for community organisations to reach this group, considering information provided through these have been deemed to be the most relevant. However, participants were unlikely to want to attend public information sessions and peer-led workshops. This finding is consistent with research reporting a stronger support for digital and online provision of support and information, considering their general affinity to technology and the potential to be adaptive in nature as well as providing a low-threshold environment (Platteau, Herrijgers, & de Wit, 2020). These trends were not able to be predicted by compositional or individual characteristics such as resilience, psychological distress, drug taking confidence, age, or level of engagement in chemsex, but could be predicted by the contextual variable of LGBT community connectedness. This lies in concordance with sense of belonging and group or social identity to be powerful proponents of health-seeking behaviours in general (Anderson-Carpenter, Sauter, Luiggi-Hernández, & Haight, 2019; Durso & Meyer, 2013). Similarly, few differences between types of substances were found. These differences did not form an obvious pattern. No differences were found between different sexual orientations.

4.1. Strengths and limitations

This is the first study to comprehensively research drivers and barriers to information-seeking behaviour and information flow on chemsex in a sample of gay and bisexual men. Valid and reliable measurement of substance use, psychological distress, resilience and connectedness to the LGBT community were used. Measurements concerning support services knowledge and perception and use of health services were not intended to result in summary scale measurements and were hence analysed as single item scales; this potentially leads to multiple comparison problems. This study is limited by the self-selected nature of the sample and may not be generalizable. Some participants may also have overestimated their substance use or risk behaviours as the data was self-reported. While the sample size appears small, it should be interpreted in the context of considerable sensitivities related to drug use in sexualised settings and the relative proportions of chemsex-engaged men in the population. This study did not collect data on comorbidities in the sample, including substance use disorders, and did not ask about the use of substances commonly not used in chemsex-contexts. This may have an impact on both willingness to engage in chemsex as well as information-seeking behaviours and practices.

The data was collected during the COVID-19 pandemic; however, data collection took place at the beginning of the pandemic at a time with very few infections in Australia, and without major lockdowns or restrictions of social activities in Australia. It is therefore unlikely that the pandemic had a meaningful impact on the responses or chemsex behaviour of participants, particularly since the data collection focussed

in the previous 12 months, a period mostly not impacted by the pandemic.

4.2. Future directions and recommendations

The sample size impacted on our ability to analyse potential differences between subgroups such as gay and bisexual men. Future research should aim to gain further insight into potential differences between subgroups including by substances used, frequency of engagement and further relevant demographic characteristics. Future research may also further investigate information-flow between regular and casual partners, and how these relationships can be incorporated in public health responses. While the pandemic (response) was unlikely to impact our data collection, it is reasonable to assume that it impacted on both chemsex and information-seeking behaviour, particularly in the context of changes to the delivery of public health interventions and information distribution by relevant health services. Future research should be undertaken to evaluate these changes and how they impacted information-seeking practices and chemsex behaviour.

Our results identified significant room for improvement for public health interventions and offerings provided by LGBT organisations. Relevant organisation should aim to establish stronger relationships with this community to understand their information needs and information-seeking behaviour. Engaging in co-design processes has the potential to lead to resources and offerings of higher relevance for this population, particularly low-threshold interventions and offerings that may allow to reach a substantial proportion of people engaged in chemsex.

Considering the strong trust reported by participants in sexual health doctors and nurses, sexual health services should consider targeted education of medical and nursing staff on chemsex and to communicate the availability of such expertise to the community.

CRedit authorship contribution statement

Daniel Demant: Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft, Writing – review & editing. **Julie-Anne Carroll:** Methodology, Writing – original draft, Writing – review & editing. **Bernard Saliba:** Methodology, Writing – original draft, Writing – review & editing. **Adam Bourne:** Methodology, Writing – review & editing.

Declaration of Competing Interest

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

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