

ORIGINAL RESEARCH

Substance-specific readiness to change among sexual and gender minority men who use crystal methamphetamine

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Abstract

A patient-oriented approach to addressing high levels of polysubstance use among sexual and gender minority men (SGM) who use crystal methamphetamine (CM) requires an understanding of which drugs they would like to change their use of. We examined readiness to change for 24 separate substances. Participants were SGM, aged 18+, living with Canada, who used CM in the past six months that were recruited through advertisements on socio-sexual networking applications. Frequency of use and readiness to change were descriptively analyzed and associations between frequency of use and readiness to change were assessed. Only slightly more than half (53.1%) of CM-using SGM were ready now, soon, or in the future to change substance use. Participants were most ready to change their tobacco, methamphetamine, and barbiturate use. Greater frequency of use was associated with greater readiness to change for all drugs in which daily or almost daily use was common. SGM participants reported high levels of comfort being asked about their substance use from primary care, mental health, and queer-identified health professionals. Interventions addressing multiple and specific substances are needed in health care settings serving SGM who use CM. Screening, brief interventions, and referral to treatment (SBIRT) in these settings may help identify those ready to address their substance use. Harm reduction interventions should offer supports for those not wanting to change their substance use—which includes most SGM for most of the drugs they use.

Keywords

Substance use; Sexual minorities; Frequency of use; Problem recognition; Readiness; Crystal methamphetamine

1. Introduction

Globally, gay and bisexual men exhibit rates of crystal methamphetamine (CM) use that are nearly twice that of their heterosexual counterparts [1]. Their use of CM and other drugs is deeply tied to sub-cultural practices and unique social contexts that differ from patterns among heterosexual men and women who use CM [2, 3]. Despite the personal and social benefits that individuals may experience from their use of CM (e.g., euphoria, belonging, escape), elevated rates of CM use are associated with a variety of harms, including worsening mental health, suicide ideation, and psychosis [4]. Among sexual and gender minorities who have sex with men (SGM), as many as one-in-three HIV seroconversions among occur among people who use CM persistently [5, 6]. These factors merit subpopulation-specific studies of CM use among SGM to understand the unique motives, circumstances, and patterns of benefit and harm that may arise therefrom.

Compounding these effects, CM is commonly implicated

in polysubstance use—particularly among SGM engaged in sexualized drug use or street drug use [7–9]. Furthermore, polysubstance use has been identified as a barrier to CM cessation among SGM [10]. In the broader population, polysubstance use disorders are acknowledged [11] and use of multiple drugs use has been associated with poorer engagement and outcomes in substance use treatment programs [12–16].

Understanding the polysubstance use patterns of SGM who use CM may help interventionists better plan for treatments programs and interventions that address multiple patterns of drug use [17, 18]. A substance-specific approach addresses limitations of previous research and interventions, by allowing a more specific and tailored understanding of patient needs. However, addressing multiple substances in treatment settings is difficult for a variety of reasons [18]. Not the least of which are questions about whether participants are ready and willing to take action to address their polysubstance use [19–21]. Indeed, readiness to change is known to be a key predictor for substance use treatment completion [20–25].

As such, the overall purposes of the present study are to (1) identify drug-specific readiness to change patterns of problematic substance use and (2) examine how SGM who are ready to change their substance use can be best engaged. In doing so, our research was guided by the transtheoretical model of behavior change, leveraging the model to inform our study design, but emphasizing an applied focus on descriptive analyses that can help improve substance use intervention services for SGM who use CM. The transtheoretical model of behavior change poses five “stages” of readiness to change: (1) precontemplation, (2) contemplation, (3) preparation, (4) action, and (5) maintenance [26, 27]. This model proposes levels of an individual’s readiness to change their behavior and models these as five conceptual levels across a continuum of readiness to change [28]. Classically, it has been assumed that individuals progress through each level—though when applied to substance use, it is recognized that individuals may move bi-directionally across the spectrum and that their readiness is highly contingent on both biological dependence and perceptions of the substance and its impact on their lives [28]. However, greater readiness to change has been identified as an important determinant of therapeutic outcomes [28]. For a detailed review of the transtheoretical model and its application to substance use, see [28, 29]. The significance of this research is to inform approaches for substance use treatment and harm reduction and ensure SGM are appropriately served with regards to how they use substances and how they feel about their substance use.

2. Methods

2.1 Setting and context

The present study focused on CM use among SGM in Canada, where the prevalence of CM use in the general population is low and use of CM is highly stigmatized. The low prevalence of use and the stigma associated with use means there is a limited availability of appropriate and accessible services to help people who use CM reduce harms and find treatment [30]. Most of those using CM, experience complex and reinforcing social and structural barriers, including socioeconomic challenges and discrimination [30, 31]. This is particularly true for SGM who may face additional stigma, both from within the queer community and from other people who use CM but that may not be accepting of SGM identities [32]. For a detailed review of CM use among SGM see Knight [33].

2.2 Participant recruitment

Between February 14th and June 1st 2020, at the beginning of the COVID-19 pandemic, advertisements and social media posts were created and shared on Squirt, Scruff, Facebook, Twitter, and Reddit to recruit eligible participants. Eligibility criteria restricted participation to men (inclusive of transgender men) and non-binary individuals, aged 18 years or older, who have had sex with a man and used CM use in the past six months, and lived in Canada. Before completing the online study questionnaire, participants provided informed consent, and completed a short study screener to assess eligibility, per the criteria listed above. After completing the survey, par-

ticipants received a \$10 honorarium, payable by e-transfer or check using participants email or physical addresses provided by participants.

2.3 Data collection

The online survey used in this study assessed a wide range of behavioural, sociodemographic, attitudinal measures, and psychosocial measures. The questionnaire and recruitment strategy was developed in consultation with research team members, which included several participants with lived experience as SGM who have used CM. An initial draft questionnaire, iteratively revised by the study team, was developed based on previous qualitative interviews with SGM who use CM in British Columbia. More information about this qualitative research is provided in Fulcher *et al.* [34]. The present study utilizes examined measures related to substance use patterns, perceptions of substance use (*i.e.*, problem recognition and readiness to change), strategies for contacting SGM who use CM, and a range of demographic characteristics. Frequency of substance use was assessed (*i.e.*, “Daily or almost daily”, “Weekly”, “Monthly”, “Once or twice”, “Never”) for the three months prior to survey completion for twenty-four individual substances, including: Alcohol, Tobacco, Cannabis, Poppers, Nitrous Oxide, Ecstasy/Methylenedioxymethamphetamine (MDMA), Ketamine, Lysergic acid diethylamide (LSD)/Acid, Mushrooms, Hallucinogens, Crack Cocaine, Powder Cocaine, Cocaine, Crystal Methamphetamine, Mephedrone, Non-prescription attention-deficit/hyperactivity disorder (ADHD) Medications, Speed, Gamma-hydroxybutyric (GHB), Morphine, Heroin, Oxycodone/OxyContin, Codeine, other Opioids, Benzodiazepines, and Barbiturates. For each substance that participants reported using, they were shown a follow-up question, based on the transtheoretical model of behaviour change [26, 27]. The question was worded as follows: “Which of the following statements best describes your view of your current ___ use?”. For this question, they could choose one of five response options: (1) I do not think I have a ___ use problem and therefore nothing should be done about it; (2) I think I have a ___ use problem. However, I am not yet ready to take any action to solve the problem; (3) I think I have a ___ use problem, and I might take action to solve the problem in the future; (4) I know I have a ___ use problem, and I intend to take action to solve it soon; and (5) I know I have a ___ use problem, and I am ready to take action to solve it now. This measure was used as an ordinal variable to represent participant’s perceptions of substance use (*i.e.*, problem recognition and readiness to change).

As we also wanted to assess how interventionists could contact this population, we also examined responses from two select-all-that-apply questions: (1) “Where do you normally access healthcare services, including those related to your substance use?” (Response options: doctor’s office; medical clinic; sexual health clinic; outpatient clinic at a hospital; emergency room at a hospital; walk-in clinic); and (2) “Which of the following individuals would you be comfortable with if they asked you about your methamphetamine use?” (Response options: family doctor; licensed psychologist or psychiatrist;

emergency room doctor; nurse at your family doctor’s office; emergency room nurse; nurse at an STI clinic; doctor at an STI clinic; social worker at an LGBTQ2S or other organization; peer at an LGBTQ2S or other organization; friend; parent; sibling; spouse or partner). Response options were developed based on previous qualitative interviews, questionnaires used among SGM [35], and through community consultations in the development of this survey [36].

Finally, several demographic characteristics were included in this study. These included participant’s age (in years), their ethnicity (white vs. non-white), gender (cisgender man; transgender/non-binary), sexual orientation (gay vs. bisexual/other), geographic region (grouped as The Prairies (Alberta, Manitoba, and Saskatchewan), Eastern & Atlantic Canada (Ontario, Quebec, New Brunswick, Newfoundland & Labrador, Nova Scotia, Prince Edward Island), Western Canada (British Columbia and Yukon Territory)), income, and HIV-status (“I am HIV-positive”; “I think I am HIV-negative”/“I have never been tested for HIV”).

2.4 Data analysis

Data were analyzed in R-studio [37]. To provide descriptive results regarding frequency of use, readiness to act, and methods of contacting people who use CM, descriptive statistics (Frequency, Proportions, Mean, Standard deviation) and bi-variable χ^2 tests were constructed using the CreateTableOne() function. To assess the association between frequency of use and participant’s perceptions of their substance use, we treated the readiness to quit variable as an ordinal variable with five levels. Ordinal regression models were constructed for each substance in which more than 5% of users of that substance reported using it daily or almost daily; this threshold was selected due to limitations of small cell counts for variables with few daily users. The regression model allowed us to examine the association between each stage of readiness in order to assess if it was associated with frequency of use. Each ordinal regression models was constructed using the polr() function in the nnet package and included the substance-specific “readiness to change” variable as the outcome and the frequency of use for the given substance as a primary explanatory variable. The reference level we selected was “Daily/Almost Daily” as this group was considered the most conceptually distinct, easiest to contemplate as a regular pattern of use, and most distinct from others in terms of vulnerability to harm that could arise from CM use. The Brant test was used to assess the parallel regression assumption, which assesses whether an ordinal regression model is appropriate. All models controlled for age, ethnicity, gender, sexual orientation, geographic region, HIV status, and income in order to adjust for our non-representative sample and account for demographic differences. Odds ratios and 95% confidence intervals were constructed using exponentiated results from the coef() and confint() functions, respectively.

2.5 Data availability

The survey instruments and data are available upon request to the authors.

3. Results

A total of 410 participants were enrolled in this study. Included and excluded participants differed only in that excluded individuals were less likely to have identified as gay (67.8% vs. 78.5%, $p = 0.03$). Table 1 provides a demographic overview of the analytic sample. Most participants were white (71.7%), gay-identified (78.5%), cisgender (94.4%), and made less than \$60,000 CAD per year (74.9%).

TABLE 1. Demographic characteristics of sexual minority men and non-binary people in Canada who use crystal methamphetamine (N = 410).

	n (%)
Age, in years (mean (SD))	41.49 (11.17)
Non-white participants (%)	116 (28.3)
Non-cisgender participants (%)	23 (5.6)
Sexual orientation (%)	
Gay	322 (78.5)
Bisexual/Other	88 (24.1)
Geographic region (%)	
Eastern & Atlantic Canada	219 (53.4)
The Prairies	51 (12.4)
Western Canada	140 (34.1)
People Living with HIV (%)	147 (35.9)
Annual Income, CAD (%)	
<\$30,000	164 (40.0)
\$30,000–\$59,999	143 (34.9)
\$60,000–\$89,999	56 (13.7)
>\$90,000	47 (11.5)

Table 2 shows the frequency at which participants reported using each drug over the past three months. The most frequently used drugs in our sample were tobacco (39.0% used daily), crystal methamphetamine (38.0% used daily), cannabis (21.2% used daily), alcohol (13.9% used daily), poppers (6.8% used daily), GHB (5.4% used daily), benzodiazepines (3.2% used daily), and speed (2.2% used daily). Substances used by <10% of participants at all in the past 3 months included barbiturates, hallucinogens, ecstasy/MDMA, non-prescription ADHD medications, heroin, nitrous oxide, and oxycodone/OxyContin.

Fig. 1 shows the proportion of people that used each drug who: (1) were ready to act now, (2) intended to act soon, (3) thought they might act in the future, (4) were not ready to act, and (5) did not perceive their use as a problem. Briefly summarizing these results, 13.9% of participants were ready to take action for at least one of the drugs they were using; an additional 39.2% of participants were intending to take action soon or in the future for at least one drug they used; 19.3% were not ready to take action for any of the drugs they used, but they did recognize that at least one of the drugs they used posed a problem; and 27.6% felt that none of the drugs they used posed a problem. CM (11.6%)

TABLE 2. Frequency of different substance use among sexual minority men and non-binary people who use crystal methamphetamine.

	Daily or almost daily	Weekly	Monthly	Once or twice	Never
	N (%)	N (%)	N (%)	N (%)	N (%)
Alcohol	57 (13.9)	105 (25.6)	61 (14.9)	110 (26.8)	77 (18.8)
Tobacco	160 (39.0)	23 (5.6)	11 (2.7)	42 (10.2)	174 (42.4)
Cannabis	87 (21.2)	51 (12.4)	37 (9.0)	97 (23.7)	138 (33.7)
Poppers	28 (6.8)	107 (26.1)	85 (20.7)	113 (27.6)	77 (18.8)
Nitrous oxide	1 (0.2)	3 (0.7)	5 (1.2)	24 (5.9)	377 (92.0)
Ecstasy/MDMA	1 (0.2)	17 (4.1)	31 (7.6)	139 (33.9)	222 (54.1)
Ketamine	1 (0.2)	17 (4.1)	42 (10.2)	104 (25.4)	246 (60.0)
LSD/Acid	1 (0.2)	3 (0.7)	5 (1.2)	43 (10.5)	358 (87.3)
Mushrooms	3 (0.7)	4 (1.0)	8 (2.0)	72 (17.6)	323 (78.8)
Hallucinogens	1 (0.2)	1 (0.2)	7 (1.7)	26 (6.3)	375 (91.5)
Crack cocaine	4 (1.0)	7 (1.7)	16 (3.9)	68 (16.6)	315 (76.8)
Powder cocaine	3 (0.7)	16 (3.9)	33 (8.0)	120 (29.3)	238 (58.0)
Crystal methamphetamine	156 (38.0)	73 (17.8)	62 (15.1)	106 (25.9)	13 (3.2)
Mephedrone	2 (0.5)	6 (1.5)	3 (0.7)	11 (2.7)	388 (94.6)
Non-Rx ADHD medications	2 (0.5)	10 (2.4)	13 (3.2)	32 (7.8)	353 (86.1)
Speed	9 (2.2)	19 (4.6)	14 (3.4)	50 (12.2)	318 (77.6)
GHB	22 (5.4)	70 (17.1)	70 (17.1)	106 (25.9)	142 (34.6)
Morphine	3 (0.7)	6 (1.5)	3 (0.7)	21 (5.1)	377 (92.0)
Heroin	2 (0.5)	6 (1.5)	2 (0.5)	17 (4.1)	383 (93.4)
Oxycodone/OxyContin	2 (0.5)	3 (0.7)	6 (1.5)	30 (7.3)	369 (90.0)
Codeine	1 (0.2)	9 (2.2)	9 (2.2)	39 (9.5)	352 (85.9)
Other opioids	5 (1.2)	1 (0.2)	7 (1.7)	18 (4.4)	379 (92.4)
Benzodiazepines	13 (3.2)	11 (2.7)	15 (3.7)	40 (9.8)	331 (80.7)
Barbiturates	1 (0.2)	3 (0.7)	1 (0.2)	11 (2.7)	394 (96.1)

MDMA: Methyl enedioxy methamphetamine; LSD: lysergic acid diethylamide; ADHD: Drugs used for the treatment of attention deficit hyperactivity disorder; GHB: gamma-Hydroxybutyric acid.

had the highest proportion of people ready to take action about their substance use immediately, followed by tobacco (8.5%), barbiturates (6.3%), and heroin (3.7%). Meanwhile, tobacco (35.2%) crystal methamphetamine (38.3%), barbiturates (56.3%), mephedrone (68.4%), and heroin (70.4%) were the substances with the lowest proportion of respondents not viewing their use as a problem. Meanwhile, mushrooms (93.1%), ketamine (92.7%), ecstasy (89.4%), codeine (87.9%), LSD (86.5%), and poppers (86.5%) had the highest proportion of individuals who thought their use of these substances did not pose a problem.

Table 3 shows the relationship between frequency of use and readiness to act based on the series of ordinal logistic regressions. In summary, participants who used each drug at a greater frequency were more ready to take action to address their use of that substance, even after controlling for age, ethnicity, gender, orientation, geographic region, HIV status, and income. The average effect sizes for these models increased with each level of frequency—indicating a dose-

response relationship between frequency of use and readiness to act.

Supplementary Table 1 outlines potential venues where SGM who used CM might be contacted in order to help them address their substance use. Results in this table are stratified by participants' readiness for change, and few statistically significant differences were observed. Those who intended to take action now or soon, were about 10% more likely to typically access care through an emergency room compared with those who were less ready to take action or who did not think their use was a problem. Overall, the people who participants felt most comfortable having ask them about their CM use were social workers at LGBTQ2S+ organizations (53.9%), family doctors (52.4%), and licensed psychologists or psychiatrists (52.0%). The venues most strongly endorsed to advertise to other SGM who used CM included Grindr (71.0%), bathhouses (68.8%), scruff (64.6%), squirt, BBRT (55.1%), and bars or clubs (53.9%). Finally, the venues where participants most frequently accessed health services were

TABLE 3. Multivariable ordinal regression results examining association between frequency of drug use and readiness to act among sexual minority men and non-binary people who use crystal methamphetamine.

	Daily/Almost daily	Weekly	Monthly	Once or twice
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Tobacco	1.00	0.22 (0.08, 0.55) *	0.03 (0.00, 0.13) *	0.01 (0.00, 0.04) *
Alcohol	1.00	0.33 (0.15, 0.68) *	0.14 (0.05, 0.14) *	0.05 (0.02, 0.14) *
Cannabis	1.00	0.31 (0.13, 0.71) *	0.13 (0.03, 0.39) *	0.04 (0.01, 0.12) *
Powder cocaine	1.00	0.31 (0.02, 8.66)	0.13 (0.01, 3.84) *	0.02 (0.00, 0.66) *
Poppers	1.00	0.51 (0.20, 1.39)	0.21 (0.07, 0.64) *	0.10 (0.03, 0.34) *
Crystal meth.	1.00	0.55 (0.33, 0.93) *	0.34 (0.19, 0.61) *	0.06 (0.03, 0.11) *
GHB	1.00	0.27 (0.10, 0.69) *	0.04 (0.01, 0.14) *	0.01 (0.00, 0.04) *

aOR, Adjusted Odds Ratio; 95% CI, 95% Confidence Interval; *, Statistically Significant at $p < 0.05$; Each substance was tested in a separated ordinal regression model controlling for age, ethnicity, gender, orientation, province, HIV status, and income.

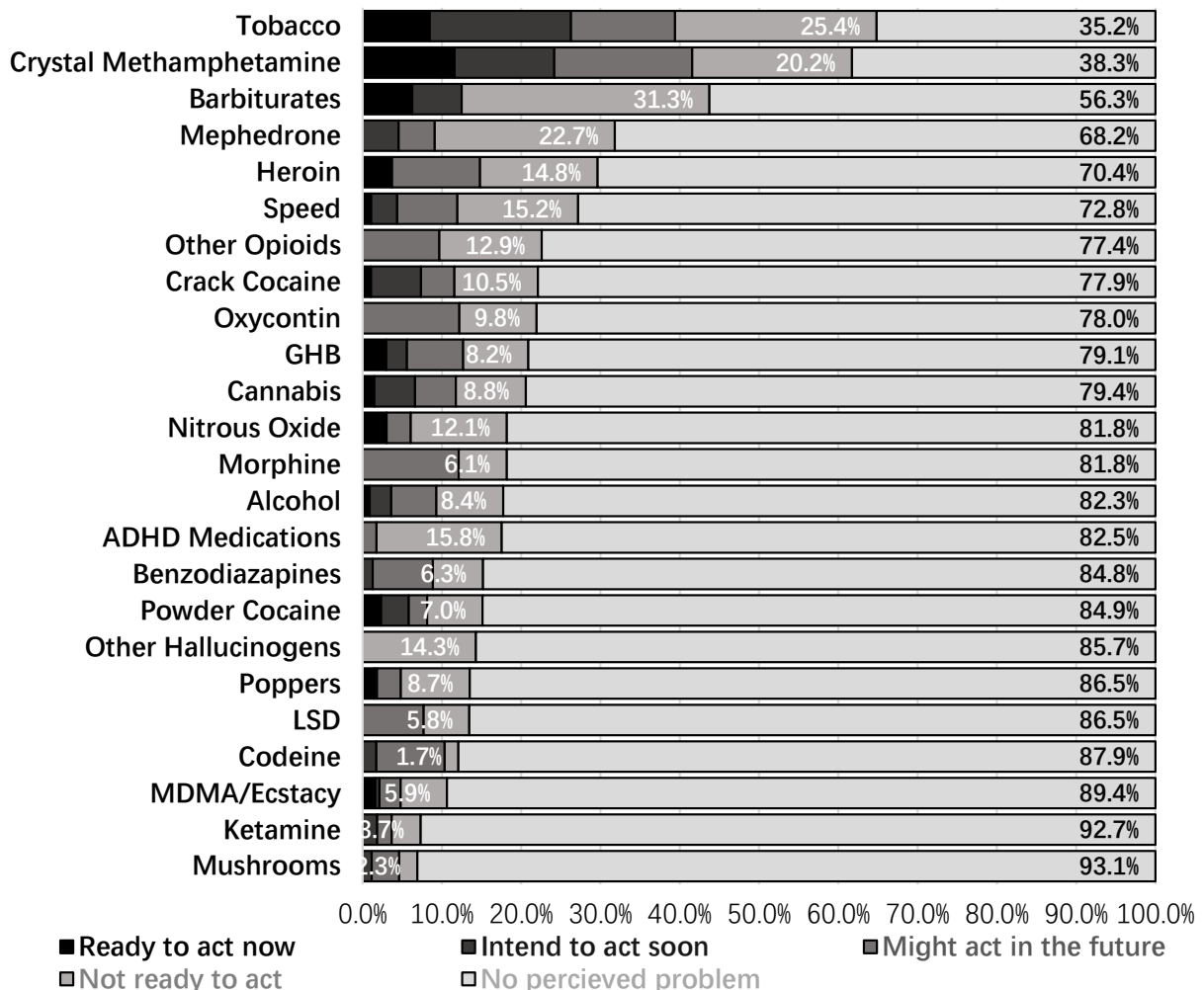


FIGURE 1. Drug-specific readiness to change among participants using each given drug.

doctor's offices (32.9%), sexual health clinics (26.8%), and other clinics (21.2%).

4. Discussion

The present study makes several unique contributions to the literature—addressing substance-specific estimates of partic-

ipant's readiness to act on substance use problems, linking this to substance use frequency, and identifying strategies for engaging participants in relevant interventions. Furthermore, this work is conducted among an understudied population: SGM who use CM [38]. Indeed, the primary aim of this analysis was to examine patterns of substance use among SGM who use CM with a focus on participant's substance-specific readiness to act on their substance use. To achieve this aim, we examined the frequency of 24 different substances used, how participants felt about each of their substances used (*i.e.*, whether they felt it was a problem, and if so whether they were ready to take action to address it), and the association between these two variables. These results showed that the most frequently used drugs among this sample were alcohol, tobacco, cannabis, cocaine, poppers, GHB, and CM. Of these frequently used drugs, there was higher levels of readiness to take action on their use of tobacco and CM, with notably less willingness to address cannabis, cocaine, popper, or GHB use. While few SGM who used CM also used heroin or barbiturates, participants were more ready to take action on these substances. These patterns and perceptions of substance use may reflect social norms and understandings about the relative acceptability and harmfulness of these substances. Previous research by Cochran *et al.* [39] suggests that norms and perceived drug availability are key factors in explaining the elevated prevalence of substance use among sexual and gender minorities [39]. Furthermore, understanding how patients perceive their use of drugs is useful for policy makers attempting to create drug control policies [40–42]. To date, people who use drugs have largely been left out of these decisions [43].

Additionally, our analyses regarding frequency of use and perceptions of use suggest that frequency of use may in some ways be seen by participants as an indicator of their needing to act. In other words, frequency of use may be a driving factor underlying perceptions of harm and need to change [44]. Indeed, our multivariable models showed that there is a considerably strong dose-response relationship between frequency of use and readiness to act. This highlights the reality that not all substance use, especially less frequent use, is necessarily considered problematic by participants. Interventions must therefore move beyond abstinence-only programs and focus on patient-oriented approaches that celebrated SGM's treatment choices and successes irrespective of how those might align with traditional public health goals focused on abstinence [22, 45]. Substance use reduction, substitution, and other harm reduction strategies may therefore be key alternatives to abstinence only interventions—especially within the context of polysubstance use treatment programs [46, 47]. Speaking to the potential efficacy of these approaches, research has long demonstrated that placing less emphasis on clean urine screens and more emphasis on patients achieving a level of substance use that they are comfortable with provides a superior strategy for averting harms associate with substance use [48–50].

Our study also explored opportunities for engaging SGM who use CM. Indeed, given the potential harms associated with CM use and polysubstance use, it is important to understand how SGM engage in care or prefer to engage in care [16, 20]. In addressing this aim, we asked participants about where they accessed care, who they felt comfortable with approaching

them about their substance use, and where they thought we could reach other people who use CM. As part of this analysis, we examined whether participant's responses to these variables differed based on their readiness to take action. In completing these analyses, we concluded that the best potential outreach venues were largely the same regardless of whether you were trying to reach individuals ready to change or not. In the end, a majority of participants reported they would feel comfortable talking to regulated professionals (*e.g.*, physicians, psychologists, and social workers) and those with subject-matter competence (*e.g.*, LGBTQ2S+ organizations). Broad-based screening interventions are thus of potential value—allowing patients to access the supports they need at any point of interaction within the healthcare system. Given the high prevalence of substance use disorders among SGM, implementing screening, brief interventions, and referral to treatment (SBIRT) programs in sexual and community health clinics could be a good strategy for supporting SGM with substance use disorders [51–53]. Indeed, a plurality of respondent's reported accessing care regularly through their doctor's offices and at clinics, including sexual health clinics. Notably nearly one-in-five participants who were ready take action on their substance use said that they accessed care through emergency rooms—a rate considerably higher when compared with SGM who did not think they had any substance use problems (17.5% vs. 4.4%). That said, we recognize that there are many barriers that must be overcome in order to implement substance use screening programs within primary and specialty care settings—particularly with respect to ensuring that settings serving SGM are culturally safe for queer people [54]. Existing continuing medical education programs designed to implement SBIRT among SGM can help overcome these barriers [55]. In addition to these formal medical settings, participants in this study endorsed popular geosocial networking applications and in-person queer-friendly venues (bathhouses, bars, and clubs) as ideal points of contact for reaching SGM who use CM. Developing campaigns appropriate for these venues is an ongoing implementation challenge, however, investments in reaching SGM who use CM are important and these data support continued pursuit of these outreach activities.

5. Limitations

The present study has several limitations. First, our use of convenience online sampling raises risk of selection bias. SGM are known to be costly to recruit due to their geographic spread and relative anonymity, and online sampling is a common strategy employed to recruit convenience samples [56, 57]. Second, our analyses are conducted only among SGM who reported using CM in the past six months. Therefore, it is important to recognize that the substance use motives and patterns may not be generalizable to all SGM. Indeed, SGM who use CM are a well-established sub-group within SGM communities [58]. The behaviors they exhibit and harms they are exposed to justify a targeted focus on their readiness to enter treatment [59]. Third, we note that a significant amount of data was missing from participants recruited. This is typical in online surveys—especially for vulnerable and marginalized populations. One factor that may have contributed to high initial

uptake of the survey was our modest honoraria (though perhaps not high enough to yield completion of the survey). To address this concern, we conducted bivariable tests to identify key demographic and behavioural differences between included and excluded participants. These identified few concerns. However, there remains potential for hidden non-response bias among those who began the survey. Fourth, while our study began recruitment prior to the onset of significant public health control measures for COVID-19, recruitment continued into the early pandemic in Canada. It is possible that the frequency of use and readiness to change may therefore be impacted by the COVID-19 pandemic and public health responses [60].

6. Conclusions

In conclusion, our study highlights important differences in the substances that SGM viewed as problematic and were ready to take action to address. We show that frequency of use was a strong predictor of readiness to act on substance use across substances. We also show that the majority of participants' substance use was not considered by themselves to be problematic. These findings support programs that aim to help people reduce their use of drugs or switch to less harmful alternatives. Furthermore, we report that Sexual Healthcare settings may be ideal venues for multi-component, holistic interventions—given their frequent use by SGM [61]. Given that few existing harm reduction programs are tailored specifically for SGM, our study highlights the need for a multi-pronged approach to engage SGM using CM.

AUTHOR CONTRIBUTIONS

KGC, MM, GB, KF, and NJL—designed this study. KGC—conducted data analysis and drafting of the initial paper. All authors (KGC, MM, JBG, TN, GAW, KF, GB, NJL) contributed to the review of the final manuscript across multiple rounds of feedback.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethics approval for this study was received from the Research Ethics Board of the University of Victoria (#19-0070).

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CONFLICT OF INTEREST

The authors declare no conflict of interest. Kiffer G. Card is serving as one of the Guest editors of this journal. We declare that Kiffer G. Card had no involvement in the peer review of this article and has no access to information regarding its peer review. Full responsibility for the editorial process for this article was delegated to AW and AT.

SUPPLEMENTARY MATERIAL

Supplementary material associated with this article can be found, in the online version, at <https://?/>.

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