Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Examining the impact of social distancing and methamphetamine use on sexual risk and intimate partner violence in sexual and gender minority young adults during the COVID-19 pandemic

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ABSTRACT

Background: During the COVID-19 pandemic in 2020, concerns were raised about the potential impact of pandemic-related social distancing measures on existing health disparities among sexual and gender minority (SGM) young adults, including HIV transmission risk and intimate partner violence (IPV). Another concern was the potential for increased methamphetamine use during the pandemic, which is a known risk factor for HIV transmission and IPV.

Methods: The present analysis examines the impact of COVID-19 social distancing (social distancing and quarantining) and methamphetamine use on HIV risk and IPV in a combined dataset from 3 cohort studies of SGM young adults (two in Los Angeles and one in Chicago) from May 2020 to April 2021 (n = 1142). Bivariate analyses and multivariable logistic regressions were estimated.

Results: The median age was 26. All participants were assigned male at birth and most participants were men (93.8%). The largest racial groups were Hispanic/Latinx (44.6%) and Black (29.0%). In adjusted models methamphetamine use was consistently associated with having a new sex partner, higher numbers of sex partners, and experience of IPV, during the pandemic. Reporting no social distancing and reporting one social distancing behavior, were associated with experience of IPV relative to reporting 2 social distancing behaviors. Social distancing was not associated with sexual risk behavior or Pre-exposure Prophylaxis use.

Conclusions: SGM young adults live at the intersection of multiple vulnerabilities during the COVID-19 pandemic. Addiction services, HIV prevention services, and violence support services should be prepared to support young adult SGM needs, particularly those who use methamphetamine.

1. Background

In early 2020, the increase in COVID-19 cases in the U.S. resulted in policies at multiple levels of government to increase social distancing to reduce the spread of the virus (Döring, 2020). Lives were disrupted in many ways. Social distancing efforts resulted in lower access to community spaces such as restaurants, bars and clubs, as well as a reduction of personal social gatherings. One concern for sexually active sexual and gender minority (SGM) populations (e.g., men who have sex with men and transgender women) was the risk for COVID-19 during sexual encounters (Sanchez et al., 2020) as well as potential disruptions in the use of Pre-exposure Prophylaxis (PrEP) for the prevention of HIV transmission (Chow et al., 2021; Hammoud et al., 2020a; Reyniers et al., 2020; Sanchez et al., 2020). Additional concerns were increases in intimate partner violence (IPV) (Phillips et al., 2020; Tomar et al., 2021) as well as the possibility of increased substance use (Carrico et al., 2020)

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due to social isolation and related anxiety during the pandemic. Researchers are still trying to discern the ongoing impact of the ever-evolving COVID-19 pandemic on the lives of SGM young adults.

2. Minority stress framework

Minority Stress is a framework that was developed by Brooks (Brooks, 1981) and later popularized by Meyer (Meyer, 1995). The framework posits that sexual and gender minorities experience forms of SGM stigma that result in elevated stress and negative outcomes (Meyer, 1995). This framework has been linked to SGM health disparities and outcomes such as mental health (Meyer, 1995) sexual risk (Flentje et al., 2019), substance use (Goldbach et al., 2014), and intimate partner violence (Longobardi and Badenes-Ribera, 2017). While the literature addressing minority stress is extensive and links these health disparities within SGM populations, it was not designed for disaster conditions such as a pandemic, nor has it been regularly tested under disaster response conditions that may also elevate levels of stress (Salerno et al., 2020). Known coping strategies for minority stress include deeper connection to supportive SGM communities (Gonzales et al., 2020) and affirming care (Hawke et al., 2021) both of which may have been severely curtailed under the context of the earlier part of the pandemic due to social distancing measures (Campbell, 2021; Salerno et al., 2020). Scholars posit that social distancing measures may exacerbate existing health disparities in SGM populations by reducing access to these known buffers for minority stress processes (Campbell, 2021; Salerno et al., 2020). Thus, while social isolation behaviors in response to a pandemic may help reduce risk for COVID-19 transmission, they reduce behaviors that support health in SGM populations.

3. Sexual risk behavior during the COVID-19 pandemic

Broadly speaking, the research from the early months of COVID-19 pandemic suggests an overall decline in sexual activity among SGM (Chow et al., 2021; Harkness et al., 2020; Linnemayr et al., 2020; Sanchez et al., 2020; Traeger et al., 2021). This includes an observed reduction in sexual risk behavior among men who have sex with men (MSM) such as a decline in number of overall sex partners (Sanchez, Travis H et al., 2020), casual sex partners (Chow et al., 2021; Hammoud et al., 2020b; Reyniers et al., 2020; Traeger et al., 2021), and condom-less sex (Linnemayr et al., 2020). Similarly, in a U.S. based study from April 2020, 51.3% of MSM reported a reduction in number of sex partners, 69.2% reported a reduction in opportunities to have sex, and 47.2% reported a reduction in the use of hookup apps to meet partners in person; however, it is worth noting that only 5.4% reported a reduction in access to condoms (Sanchez, Travis et al., 2020). There is very little research addressing gender minorities' sexual risk during COVID-19; however, one longitudinal study observed a reduction in condomless sex in a sample of transgender women from 53% pre--COVID-19–31% in May 2020 (Linnemayr et al., 2020). While studies observed reductions in sexual risk behavior more generally, they did not examine possible COVID-related correlates. It has been suggested that the initial reduction in sexual activity and any subsequent reductions in new HIV and STI diagnoses may be short lived due to shifting social distancing guidelines (Hammoud et al., 2020a).

4. PrEP use and other sexual health services during the COVID-19 pandemic

Several studies have documented a reduction in PrEP use during COVID-19, with estimated discontinuation rates as high as 41.8% (Davey et al., 2020; Hammoud et al., 2020a; Torres et al., 2020). One study linked PrEP discontinuation during COVID-19 to overall reductions in casual sex, finding that 86% of participants attributed their discontinuation to a decreased number of casual sexual encounters (Hammoud et al., 2020a). Efforts to encourage social distancing during the COVID-19 pandemic may also be redefining SGM relationships with sexual health services; some studies have reported reductions in access to sexual healthcare services including HIV testing, PrEP services, and other reproductive services (Nagendra et al., 2020; Stephenson et al., 2021a, 2021b) (Sanchez et al., 2020; Stephenson et al., 2021a, 2021b).

5. Intimate partner violence

Experience of IPV is elevated among SGM relative to cisgender and heterosexual individuals (Finneran and Stephenson, 2013; Peitzmeier et al., 2020). For years, experience of IPV has been a known correlate of HIV risk and substance use among SGM such that SGM who experience IPV are at higher risk for HIV and more likely to use substances (Buller et al., 2014). During the COVID-19 pandemic some have suggested that social confinement may impact experience of IPV and access to IPV resources during the pandemic (Phillips et al., 2020; Tomar et al., 2021). Some surveillance data has suggested increases in domestic violence service-seeking during the COVID-19 pandemic in general populations (Pedrosa et al., 2020) and one study found increased experience of IPV among adult gay and bisexual men in the first three months of COVID-19 lockdown (Stephenson et al., 2021a, 2021b); however, no known studies have examined the impact of COVID-19 related social distancing and IPV in SGM young adult populations.

6. Methamphetamine Use during the COVID-19 pandemic

Earlier in the pandemic, scientists warned against the possible impact of increased methamphetamine use on sexual risk behaviors, particularly among SGM youth and young adults (Carrico et al., 2020). This is particularly relevant to SGM populations because methamphetamine has been a consistent driver of HIV transmission and an increasing epidemic in these populations (Carrico et al., 2020). Scientists have also called for an examination of the associations between methamphetamine use and adherence to social distancing on sexual risk in SGM populations (Carrico et al., 2020). Indeed, among adult SGM, the use of illegal drugs has been found to be associated with condomless anal sex (Starks et al., 2020) and a heightened willingness to attend public sex venues (Meunier et al., 2021) during the pandemic; however, published research has not yet examined the influence of methamphetamine on sexual risk among young adult SGM during the pandemic. Moreover, while methamphetamine has been linked to IPV in SGM populations (Finneran and Stephenson, 2013; Wu et al., 2015) published research has yet to address the influence of methamphetamine use on IPV among SGM during the COVID-19 pandemic.

7. Current study

In order to better understand the impact of the conditions of the COVID-19 pandemic on HIV risk and IPV among SGM young adults, the present study seeks to examine: (1) the relationship between COVID-19 related social distancing and sexual risk behaviors and IPV; (2) the effect of methamphetamine use on sexual risk behaviors and IPV; and (3) the effect of the interaction between COVID-19 related social distancing and methamphetamine on sexual risk behaviors and IPV among SGM young adults.

We hypothesize that: 1) high adherence to COVID-19 related social distancing will be negatively associated with sexual risk behaviors and positively associated with IPV, 2) methamphetamine use will be positively associated with sexual risk behaviors and IPV, and that 3) the interaction of low social distancing and methamphetamine use will be positively associated with sexual risk behavior and IPV.

8. Methods

8.1. Study setting and population

This study was conducted as part of the Collaborating Consortium of Cohorts Producing National Institute of Drug Abuse Opportunities (C3PNO). Details of the participating cohorts and other methodology have been previously described (Gorbach et al., 2021), but in sum, the C3PNO is comprised of nine NIDA funded cohorts located in major cities throughout North America (Baltimore, Miami, Chicago, Los Angeles, and Vancouver) with a combined sample size of up to 12,000 active participants. Three of the C3PNO cohorts follow a diverse group of SGM youth and young adults (including young men who have sex with men, transgender women, and non-binary people assigned male at birth). These include the mSTUDY and HYM studies (both in Los Angeles), as well as the RADAR study in Chicago (Schalet et al., 2020). Starting in May 2020, the Consortium launched a COVID-19 survey in order to examine changes in substance use, substance use disorder treatment, and HIV prevention and care in the midst of, and following, the COVID-19 pandemic.

Each participating cohort administered the survey to a minimum of 200 participants who were eligible if they: (1) were enrolled in one of the eight participating C3PNO cohorts; (2) participated in a study visit in the preceding 12 months prior to launch of the COVID survey; (3) were English and/or Spanish speaking; and (4) willing and able to complete the survey remotely. Most participants had a recent history of substance use as determined by self-report. The survey was either self-administered through a web-based survey for participants that had computer and internet access, or interviewer administered by telephone for those participants without online access. The survey took approximately 20 min to complete, and participants were compensated for their time. The study was approved by the Institutional Review of Boards of the consortium cohorts, and each participant provided informed consent for their study participation.

8.2. Sample

The current analysis includes COVID-19 survey data from the three cohort studies that focused on SGM youth and young adults, from May 2020-April 2021 (n = 1142). The data includes visits from up to two time points per participant, for a total of 1837 observations. The median age was 26 and all participants were assigned male at birth. Most participants identified as male (93.8%). The largest racial groups were Hispanic/Latinx (44.6%) and Black (29.0%). About a third of participants were unemployed (32.8%) and 7.0% reported unstable housing. Sample characteristics are reported in Table 1.

8.3. Measures

8.3.1. Social distancing

Participants were able to select one or more COVID-19-related behaviors from a list of 11 response options stemming from the question "What are you doing/did you do during the COVID-19 pandemic? (Check all that apply)." Two protective social distancing behaviors that could result in social isolation were included in this analysis: (1) "Practicing social distancing (i.e., reducing your physical contact with other people in social, work, or school settings by avoiding large groups and staying 3–6 feet away from other people)" and (2) "Isolating or quarantining yourself (i.e., while you are sick or if you have been exposed, separating yourself from other people to prevent others from getting it)." These items were then summed for an index ranging from 0 to 2.

8.3.2. Methamphetamine use

Methamphetamine use was assessed using a single item. "In the past month, how often did you use each of the following? (Meth (glass, crystal, amphetamine, tina, speed)." Response options are on a 5-point Likert scale from never (0) to daily (4).

Table 1
Sociodemographic characteristics of C3PNO participants completing COVID-19 module, May 11, 2020 – April 16, 2021 (n = 1837)[a].

	Baseline visit (n = 1142)~		Total visits (n = 1837)	
	n	%	n	%
Age (median, IQR)	26 (23–29)		26 (24–30)	
Sex at birth				
Male	1142	100.0	1837	100.0
Female	0	0.0	0	0.0
Gender				
Male	1042	93.8	1691	94.2
Transgender	29	2.6	41	2.3
Other	40	3.6	63	3.5
Race/Ethnicity				
Black, non-Hispanic	327	29.0	512	28.2
Hispanic/Latinx	503	44.6	834	46.0
Other	127	11.3	197	10.9
White, non-Hispanic	171	15.2	271	14.9
Unstable Housing^	87	7.0	127	7.1
Unemployed	367	32.8	573	31.8
HIV-positive	317	28.1	525	28.8
Cohort				
HYM	345	30.2	608	33.1
mSTUDY	340	29.8	573	31.2
RADAR	457	40.0	656	35.7

Abbreviations. IQR=Interquartile range
~ Baseline defined as completion of first COVID module survey
[a] Sum may not equal due to missing data

8.3.3. Anxiety

Anxiety was measured using the General Anxiety Disorder Scale 7 (GAD-7) (Löwe et al., 2008). The scale consists of 7 items representing symptoms of anxiety such as "trouble relaxing" and "feeling nervous, anxious, or on edge." Response options are "not at all" (0), "several days" (1), "over half the days" (2), and "every day" (3). Items are summed with a min of 0 and a max of 21. Cronbach alpha was.94.

8.3.4. COVID-19 worry

COVID-19 worry was measured using a single item. "On a scale of 1–10, how worried are you about COVID-19 pandemic?" Responses were recorded on a 10-point scale from (1) not worried at all to (10) extremely worried.

8.3.5. COVID-19 impact

COVID-19 Impact was measured using a single item. "How much is/did the COVID-19 pandemic impact your day-to-day life?" Responses were on a scale from "not at all" (1) to extremely (5).

8.3.6. Intimate partner violence

IPV was measured with a single item: "Has a lover, boyfriend, or girlfriend hit, kicked or slapped you in the past month? We only mean times when that person meant to hurt you physically. Not when you were just playing around." Responses were coded as "Yes" (1) or "no (0). Only a measure of physical IPV was used, because a common measure of other forms of IPV (e.g. emotional, sexual, etc.) were not available across cohorts.

8.3.7. Sexual risk behavior

Sexual risk was measured in two ways: new sex partners in the past month and number of sex partners in the past month. Participants were asked "How many people have you had sex with in the past month? Please enter a number, and put 0 if none." Responses could range between 0 and 100. After reporting number of sex partners participants were asked "Were any of those [partners] new partner(s)?" Responses were coded as "Yes" (1) or "No" (0). Similar to IPV, we were limited to

common measures across cohorts, which did not include more nuanced measures of condom use.

8.3.8. PrEP use

PrEP use in the past month was asked as part of a question about prescription medication: "Are you on any daily medications prescribed for you by a medical provider for the following? Check all that apply." PrEP use in the past month was coded as "yes" (1) or "no" (0).

8.3.9. Demographics and other covariates

These analyses also included a range of demographics and other covariates. Age was measured in years. Race/ethnicity included "Black, non-hispanic," "Hispanic/Latinx," white, and "Other racial identity" which was a combination of numerically smaller racial categories (e.g., indigenous, Asian, and write-in responses). Gender included male, transgender, and "other gender identity." Unstable housing included individuals who indicated living in a shelter, transitional house, street/outside/tent/encampment, or abandoned building, a vehicle, hotel, motel, dorm or group home and was coded as unstable housing (1), or stable housing (0). Self-reported HIV-status was recorded as positive (1), or negative/unknown (0).

8.3.10. Analysis

Analyses were conducted in SAS Software version 9.4 (SAS Inc., Cary, NC). Descriptive statistics including mean, median, and frequency distributions are provided at the participant level (unique individuals) and for the sample overall (i.e., repeat measures). Comparisons of demographics, substance use, and sexual risk behaviors between those who reported varying levels of social distancing were based on chi-square methods adjusting for the effect of the subject (i.e., repeated measures). Factors associated with the outcomes of interest were assessed using regression analysis with generalized estimating equations in order to account for the within person correlations. Dependent variables included new sex partner(s), number of partners, and IPV. Interaction terms between methamphetamine use and COVID-19 protective practices were estimated. GEE was used to account for repeat measures within individuals. Univariate analyses along with a priori knowledge informed variables for inclusion in the multivariable models.

9. Results

9.1. Univariate

Univariate analyses are reported in Tables 1 and 2. The median number of sex partners in the past month was 1, with 28.1% of participants reporting 2 or more partners. Among those reporting a sex partner in the past month, the median number of new sex partners was 2 with 24.8% of participants reported having a new sex partner in the past month. About 3.2% of participants reported experiencing IPV in the past month. About 12.7% of participants reported methamphetamine use in the past month.

9.2. Regressions

9.2.1. Bivariate

Methamphetamine use was significantly associated with social distancing such that people who used methamphetamine were more likely to report no social distancing behaviors compared to those who reported 2 social distancing behaviors (17.7% compared to 10.0%, see Table 3). Methamphetamine use was also associated with all 3 outcomes in bivariate analyses such that methamphetamine users had an increased odds of new sex partners (odds ratio [OR]=2.44, 95% confidence interval [CI] 1.75–3.38), having 2 or more new sexual partners in the past month (OR 3.23, 95% CI 2.37–4.41), and IPV (OR=6.89, 95% CI 3.81–12.44) as compared to those who did not report methamphetamine use in the past month.

Table 2
COVID-19 social distancing behaviors and sexual risk behaviors among C3PNO participants completing COVID-19 module, May 11, 2020 – April 16, 2021 (n = 1837)[a].

	Total (n = 1837)	
	n	%
COVID-19 social distancing behaviors		
Social distancing	1532	85.8
Isolating/quarantine	927	51.9
Number of COVID-19 Protective Behaviors~		
None	217	12.2
One	679	38.0
Two	890	49.8
How much has COVID-19 impacted day to day life		
Not at all	81	4.5
Somewhat	531	29.3
A lot	1199	66.2
Worry about COVID-19 (scale 1–10), median (IQR)	7 (5–8)	
Number of sex partners, past month (Median, IQR)	1 (0–2)	
Number of sex partners, past month		
None	663	36.5
1	644	35.2
2 or more	511	28.1
New sex partner, past month	449	24.8
Number of new sex partners, compared to pre-COVID-19^		
More	16	13.7
Less	50	42.7
About the same	51	43.6
Sexual practices with new sex partners, compared to pre-COVID-19^		
Same sex practices	75	66.4
Avoided some types of sex activities	20	17.7
Avoided a lot of sexual activities	18	15.9
IPV, past month^^	56	3.2

Abbreviations. IQR=Interquartile range; IPV=Intimate Partner Violence
[a] Sum may not equal due to missing data
~ Number of behaviors based on the two factors listed above
^ Among those reporting at least 1 new sex partner and implemented in round 2 (n = 120)
^^ IPV defined as being hit, kicked, or slapped by a partner

Bivariate associations were observed between social distancing and number of sex partners in the past month such that participants who reported one social distancing behavior had a greater odds of reporting new partners in the past month (OR= 1.30, 95% CI 1.03–1.65), and having 2 or more new sexual partners in the past month (OR=1.22, 95% CI 1.00–1.48) relative to those who reported 2 social distancing behaviors. Reporting no social distancing behaviors was associated with IPV in the past month relative to individuals who reported two social distancing behaviors (OR=3.05, 95% CI 1.32, 7.08). COVID-19 protective social distancing was not associated with PrEP use in bivariate analysis.

9.3. Multivariable analyses

Based on multivariable analyses methamphetamine use was independently associated with all three outcomes (i.e.past month reports of new sex partners, number of partners, and IPV). After adjusting for HIV-status and methamphetamine use, reduced COVID-19 protective social distancing remained significantly associated with IPV such that those who reported no social distancing behaviors had higher odds of IPV (aOR=2.95, 1.23–7.10) and those who reported only one of the two COVID-19 social distancing behaviors had higher odds of IPV (aOR=2.02; 95% CI 1.01–4.03) relative to those who had two social distancing behaviors. Unstable housing, living with HIV, and higher anxiety scores all remained positively significantly associated with IPV. Models are presented in Table 4. Interaction terms were assessed for methamphetamine and COVID-19 protective behaviors for all three outcomes, but interactions were not significant.

Table 3
Prevalence of sexual risk behaviors by COVID-19 social distancing behaviors, among C3PNO participants completing COVID-19 module, May 11, 2020 – April 16, 2021 (n = 1837)* .

	COVID-19 social distancing behaviors: None (n = 217)		COVID-19 social distancing behaviors: 1 (n = 679)		COVID-19 social distancing behaviors: 2 (n = 890)		P-value^
	n	%	n	%	n	%	
Meth use (past month)	38	17.7	90	13.4	89	10.0	0.03
Number of sex partners, past month (Median, IQR)	1 (0–1)		1 (0–2)		1 (0–2)		0.03
Number of sex partners, past month							< 0.01
None	97	45.3	66	30.8	51	23.8	
One	218	32.4	250	37.2	204	30.4	
Two	331	37.3	320	36.1	236	26.6	
New sex partner, past month	48	22.5	186	27.8	204	23.1	0.09
IPV, past month~	11	5.7	23	3.5	17	1.9	0.05
PrEP, past month**	21	15.8	114	25.2	163	23.7	0.06

Abbreviations. IQR=Interquartile range; IPV=Intimate Partner Violence; PrE-P=Pre-exposure Prophylaxis
COVID-19 protective behaviors include social distancing and/or isolating
*Sum may not equal due to missing data
~IPV defined as being hit, kicked, or slapped by a partner
^adjusted for repeat measures
** *Among HIV-negative participants

10. Discussion

This study contributes to the understanding of how the COVID-19 pandemic impacts the health of SGM young adults in the early part of the COVID-19 pandemic. Particularly, it is the first to examine the impact of social isolating behaviors and methamphetamine use on sexual risk behaviors and IPV among young SGMs during the pandemic, positing that these known health disparity conditions may be further exacerbated by social isolating behaviors.

The results of the present analysis highlights the elevated risks faced by SGM young adults who use methamphetamines, which persist in the context of the pandemic, including a higher likelihood of having new sex partners, higher numbers of sexual partners, and a higher likelihood of experiencing IPV. People who used methamphetamine were also less likely to report social distancing. Not only do these patterns put SGM who use methamphetamines at higher risk for HIV transmission, emotional distress, and injury, but they could also pose a higher risk for COVID-19 transmission in the context of a global pandemic. Moreover, this may also coincide with an increase in methamphetamine use during pandemic conditions (Carrico et al., 2020), which could further exacerbate the aforementioned comorbidities. This highlights how young SGM who use methamphetamines may be a relevant target population for services (substance use services, HIV-risk services, and violence services) during COVID-19 and potentially in future pandemics.

The results addressing the impact of COVID-19 social distancing were mixed. While researchers have proposed that the social distancing measures may reduce PrEP use (Davey et al., 2020; Hammoud et al., 2020a; Torres et al., 2020), this study was not sufficiently powered to observe a statistically significant association between social distancing and PrEP use. While it was not significant, those who reported no COVID-19 protective behaviors had the least amount of PrEP use compared to those with one or more social distancing behaviors. Reduced PrEP use may be due to other factors, such as decreases in

Table 4
Factors associated with sexual risk behaviors among YMSM C3PNO participants completing COVID-19 module, May 11, 2020 – April 16, 2021 (n = 1837).

	Outcome: New sex partner (s), past month				Outcome:^^ Number of partners, past month				Outcome: IPV, past month#			
	OR	95% (CI)~	aOR[a]	95% (CI)~	OR	95% (CI)~	aOR[a]	95% (CI)~	OR	95% (CI)~	aOR[a]	95% (CI)~
Age	1.00	(0.90–1.13)	–	–	1.00	(0.91–1.12)	–	–	1.05	(1.02–1.08)	–	–
Race/Ethnicity[a]												
Black, non-Hispanic	1.27	(0.95–1.69)	–	–	0.81	(0.59–1.11)	–	–	1.15	(0.44–2.96)	–	–
Hispanic/Latinx	1.07	(0.70–1.63)	–	–	1.11	(0.82–1.48)	–	–	1.21	(0.51–2.88)	–	–
Other	1.26	(0.86–1.86)	–	–	0.85	(0.58–1.26)	–	–	1.18	(0.39–3.56)	–	–
White, non-Hispanic	1.00	Reference	–	–	1.00	Reference	–	–	1.00	Reference	–	–
Unstable Housing^	1.07	(0.71–1.61)	–	–	0.90	(0.59–1.36)	–	–	3.78	(1.76–8.05)	2.54	(1.33–4.84)
HIV-positive	0.99	(0.76–1.28)	–	–	1.10	(0.88–1.37)	–	–	2.71	(1.50–4.89)	1.91	(1.03–3.53)
Methamphetamine use, past month	2.47	(1.81–3.39)	2.44	(1.76–3.38)	3.23	(2.37–4.41)	3.42	(2.50–4.70)	6.89	(3.81–12.44)	3.88	(2.10–7.18)
Moderate/Severe Anxiety (GAD-7 ≥ 10)	1.14	(0.89–1.45)	–	–	1.26	(1.02–1.58)	–	–	3.16	(1.81–5.50)	3.52	(1.90–6.50)
Worry about COVID-19 (scale 1–10)	0.98	(0.89–1.02)	–	–	0.96	(0.91–1.10)	–	–	0.94	(0.84–1.06)	–	–
How much has COVID-19 impacted day to day life												
Not at all	1.00	Reference	–	–	1.00	Reference	–	–	1.00	Reference	–	–
Somewhat	1.72	(0.95–3.14)	–	–	2.42	(1.51–3.88)	–	–	0.51	(0.20–1.30)	–	–
A lot	1.51	(0.84–2.70)	–	–	2.00	(1.27–3.15)	–	–	0.46	(0.19–1.13)	–	–
Number of COVID-19 Protective Behaviors[b]												
None	1.00	(0.69–1.43)	0.92	(0.64–1.33)	0.77	(0.56–1.04)	0.70	(0.52–0.95)	3.05	(1.32–7.08)	2.95	(1.23–7.10)
One	1.30	(1.03–1.65)	1.27	(1.00–1.61)	1.22	(1.00–1.48)	1.19	(0.98–1.44)	1.84	(0.94–3.55)	2.02	(1.01–4.03)
Two	1.00	Reference	1.00	Reference	1.00	Reference	1.00	Reference	1.00	Reference	1.00	Reference

Abbreviations. YMSM=young men who have sex with men; OR=Odds Ratio; aOR= adjusted Odds Ratio; CI=Confidence Interval; IPV=Intimate Partner Violence
~ adjusts for the effect of the subject (i.e. multiple observations for the same participant)
^ unstable housing defined as living in shelter, transitional housing, street, vehicle, abandoned building, or group home
[a] Model adjusts for HIV status and methamphetamine use
[b] Number of behaviors based on the two factors listed in Table 2
^^ Based on ordinal regression with outcome categories of 0 partners, 1 partner, or 2 or more partners
# IPV defined as being hit, kicked, or slapped by a partner

sexual activity or insurance access (Sanchez et al., 2020; Starks et al., 2020) or possibly underlying characteristics of participants such as conscientiousness. This poses questions about HIV risk patterns during COVID-19, relative to social distancing efforts. For example, if an individual is adhering to recommended social distancing, one would expect to observe a reduction in number of new sexual partners. Several factors could be at play; individuals may be looking at COVID-19 risk differently as it relates to sexual activity, and may discuss COVID-19 risk behaviors with potential partners to assess COVID-19 risk (Banerjee and Sathyanarayana Rao, 2020). Alternatively, individuals may exhibit risk compensation (Mantzari et al., 2020) in which some individuals who largely adhere to social distancing are willing to have casual sexual interactions because they perceive themselves to be of relatively minor risk. Future research should examine how young SGM evaluated risk for COVID-19 transmission when considering casual sex partners and whether risk compensation was a factor in partner seeking within the context of the pandemic.

With regard to IPV, an association between social distancing and IPV was observed, such that fewer distancing behaviors were associated with higher risk for IPV. This is contrary to speculation presented by researchers that pandemic-related social distancing may lead to increased social distancing therefore exacerbating risk for IPV (Krause, 2021). While it is difficult to discern a definitive reason for the direction of this association from the current analysis, there are several possible reasons. First, as this is a cross-sectional analysis, where IPV was modelled as an outcome, the data do not take temporality into account. An implication of this limitation could be that individuals who experience IPV are less able to adhere to COVID-19 social distancing measures due to their toxic home environment and may seek refuge outside of their home environment. Another possible explanation could be that, given the relatively young sample, there could be a lower likelihood of cohabitation with a romantic partner. If this is the case, it would mean that individuals may be less able to simultaneously observe social distancing measures while also seeing romantic partners. The current data partially supports this in that among those with no social distancing measures 37% had 2 or more partners, whereas among those who reported two or more social distancing behaviors 26% reported having two or more partners. Unlike cohabitating partners, non-cohabitating partners who employ stricter social distancing could experience a protective effect from IPV due to reduced contact with potentially violent partners who live elsewhere. This highlights a potential way that risk factors for IPV may vary by age among SGM in the context of the pandemic. Domestic violence services should be prepared to support the unique needs of young SGM populations.

10.1. Limitations

While this analysis has several strengths (e.g. a large sample, measurement of COVID-19 social distancing behaviors), some limitations should be considered. First, this analysis is cross-sectional, which means conclusions about causality cannot be drawn. Second, it does not include data from the pre-pandemic period. This means that observing change in the methamphetamine use or in the outcomes as a result of the pandemic is not possible. While combining multiple cohorts strengthens this analysis, we were limited to measures that were available across cohorts. Only a measure of physical IPV was available, so we are not able to draw conclusions about other forms of IPV. Sexual risk measures did not include nuances around condom use, so we are not able to draw conclusions in regard to condom use. While we were able to examine anxiety as a correlate, measures of SGM stigma were not available for this analysis, limiting our ability to draw conclusions about the full Minority Stress Framework.

11. Conclusion

This analysis highlights that SGM young adults often live at the intersection of multiple vulnerabilities, which have been partially exacerbated by the COVID-19 pandemic and related responses. Fewer COVID-19-related social distancing may be related to reduced PrEP use and were significantly associated with meth use, increased sex risk behaviors and IPV. Moreover, after adjusting for other factors fewer COVID-19-related social distancing behaviors were significantly associated with experience of IPV and methamphetamine remained a consistently associated with HIV risk behavior and IPV. Addiction services, HIV prevention services, and violence support services should be prepared to support the needs of SGM young adults, particularly those who use methamphetamine.

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Conflict of Interest Statement

The authors have no conflict of interests to disclose.

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