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Relationship Between Childhood Sexual Abuse and HIV-Related Risks Among Men Who Have Sex with Men: Findings from Mainland China

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Abstract Men who have sex with men (MSM) carry the burden of HIV infection in China. Outside of China, a history of childhood sexual abuse (CSA) has been associated with HIV-related risks (behavioral, sexual, and mental health outcomes) among MSM. We therefore evaluated the relationship between CSA and these HIV-related risks among MSM in China. Cross-sectional data were collected via a survey from gay websites and social networking applications from MSM in 30 provinces in mainland China during a 3-month period in 2014 and 2015. Overall, 999 screened MSM who responded to questions on CSA were included. Multinomial logistic regression models—adjusted for sociodemographic confounders—showed that men who reported experiencing regular CSA and contact CSA, respectively, were more likely to use substances (adjusted odds ratio [AOR], 1.91; 95% confidence interval [CI] 1.39–2.62 and AOR, 1.70; 95% CI 1.25–2.31), had a history of sexually transmitted infections (AOR, 1.81; 95% CI 1.29–2.55 and AOR, 1.65; 95% CI 1.18–2.96), had more male sexual partners (AOR, 1.06; 95% CI 1.04–1.09 and AOR, 1.05; 95% CI 1.03–1.08), engaged in more condomless sex with men (AOR, 1.89; 95% CI 1.39–2.56 and AOR, 1.72; 95% CI 1.29–2.30), and experienced more psychological distress (AOR, 1.05; 95% CI 1.02–1.08 and AOR, 1.05; 95% CI 1.03–1.08). Both frequent and contact forms of CSA were positively associated with HIV-related risks among MSM, suggesting that general CSA prevention strategies and interventions are needed to support this population.

Introduction

In recent years, human immunodeficiency virus (HIV) and other sexually transmitted infections (STIs) have spread rapidly among men who have sex with men (MSM) in China (Lu et al., 2013; Shang et al., 2012), where almost one quarter ($n = 22,000$) of new HIV infections occurred in the MSM community and the most common other at-risk groups (e.g., drug users, female sex workers) accounted for the 75% of new HIV infections from January through October 2014 (National Centre for AIDS/STD Control and Prevention, 2014). Many Western researchers (Arreola, Neilands, Pollack, Paul, & Catania, 2008; Mimiaga et al., 2009; Phillips et al., 2014) have speculated that the experience of childhood sexual abuse (CSA) is a factor contributing to the transmission of HIV. Despite limitations arising from differences in the operational definitions of CSA, which generally involve criteria such as the age of the victim, age difference between the victim and perpetrator, types of sex acts, and extent of coercion involved (Carballo-Diéguez, Balan, Dolezal, & Mello, 2012; Lenderking et al., 1997), high rates of CSA have consistently been documented among MSM (Boroughs et al., 2015; Mimiaga et al., 2009). Moreover, CSA has a well-established association with substance use (Boroughs et al., 2015; Clements-Nolle, Larson, Butta, & Dermid-Gray, 2017), psychological distress (Browne & Finkelhor, 1986; Sauceda, Wiebe, & Simoni, 2016), and health-related sexual behaviors (Bornovalova, Gwad, Kahler, Aklin, & Lejuez, 2008; Hequembourg, Parks, Collins, & Hughes, 2015) that increase the risk of HIV infection and other STIs (Richter et al., 2014). These wide-ranging and long-lasting negative effects of CSA on mental and public

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health have received increasing attention from researchers (Lloyd & Operario, 2012; Sauceda et al., 2016). However, although some studies on CSA among sexual minority men in China have indicated a high prevalence of CSA among MSM (Xu, Zheng, & Zheng, 2017b) and suggested a relationship between CSA and a non-heterosexual orientation in adulthood (Xu & Zheng, 2015b), research on this topic is limited.

Childhood Sexual Abuse Among Sexual Minority Men

Most literature indicates that the prevalence of CSA is much higher among MSM than among heterosexual men (Xu & Zheng, 2015a; Zou & Andersen, 2015). A study by Sweet and Welles (2012) showed that gay, bisexual, and heterosexual men with same-sex sexual partners were significantly more likely to have experienced CSA, compared with heterosexual individuals without same-sex partners. Friedman et al. (2011) found that gay and bisexual men more frequently reported CSA (24.5 and 21.2%, respectively), compared with heterosexual men (4.6%). In Asian settings, a high prevalence of CSA exists among sexual minority men. For example, in a qualitative study conducted in India, Mimiaga et al. (2015) found that nearly a quarter of MSM had experienced CSA. Another study (Biello, Colby, Closson, & Mimiaga, 2014) found that almost a fifth of male sex workers in Vietnam (mainly same-sex interactions) had reported CSA. In addition, men who experienced CSA are more likely to report negative psychological and public health outcomes in adulthood, compared with sexual minority men who did not experience CSA (Bartholow et al., 1994; Tomori et al., 2016; Van Bruggen, Runtz, & Kadlec, 2006).

Childhood Sexual Abuse and HIV-Related Risks

Compared with men who have not experienced CSA, MSM who experienced CSA are more likely to engage in subsequent sexual and other behaviors that increase their risk of HIV infection (Lloyd & Operario, 2012; Mimiaga et al., 2009). Generally, people who experienced CSA may be more likely to engage in risky sexual activities, to have multiple sexual partners (Senn, Carey, Vanable, Coury-Doniger, & Urban, 2006), and to use alcohol or drugs (Steele & Josephs, 1990).

Some well-performed studies have assessed the associations between the frequency or severity of CSA exposure and risky sexual and behavioral health outcomes among MSM (Brennan, Hellerstedt, Ross, & Welles, 2007; Paul, Catania, Pollack, & Stall, 2001; Sweet & Welles, 2012). Brennan et al. (2007) found that gay and bisexual men who had reported experiencing frequent CSA were more likely to engage in transactional sex for payment, to engage in current substance use, and to be HIV-infected, compared with those who had never experienced CSA. Arreola et al. (2008) examined CSA in the context of increasing severity (e.g., no "CSA," "consensual," and

"forced") and found that individuals who experienced more severe CSA were more likely to use substances and engage in high-risk sex. Additionally, previous studies have confirmed that more frequent CSA is associated with more frequent episodes of unprotected sex among HIV-positive MSM (Welles et al., 2009), whereas more severe CSA is associated with riskier sexual practices and mental health outcomes among Western adults (Arreola et al., 2008).

Many studies have demonstrated that adults who experienced CSA are more likely to experience greater psychological distress, compared with those who did not experience CSA (Browne & Finkelhor, 1986; Mimiaga et al., 2009; Werner et al., 2016). For example, a literature review by Browne and Finkelhor (1986) indicated that CSA led to subsequent anxiety, hostility, and aggression in victims. In an intervention trial, Mimiaga et al. (2009) found that MSM who reported CSA were significantly more likely to experience symptoms of depression. Adverse psychological conditions such as anxiety and depression have frequently been identified as important drivers of HIV infection among MSM (Stall et al., 2003).

Aim of the Study

In China, homosexuality remains stigmatized (Xu, Zheng, Xu, & Zheng, 2017a). Accordingly, MSM generally prefer to find sexual partners through relatively anonymous internet and mobile applications such as chat rooms targeting gay men, QQ, and other applications that allow members of the gay community to meet and interact. However, these social media interactions have likely facilitated the creation of HIV transmission networks. To date, almost all studies of associations between CSA and HIV-related risks among MSM have been conducted in Western populations; accordingly, there is a paucity of relevant data from the Chinese population.

Given the observed increase in new HIV infections among MSM and the limited Chinese literature regarding domestic CSA, our study aimed to explore the associations between CSA and HIV-related risks (behavioral, sexual, and mental health determinants of HIV risk) among MSM. We hypothesized that MSM who reported HIV-related risks would be more likely to have experienced CSA, particularly more severe or more frequent CSA.

Method

Participants

For this cross-sectional study, we recruited participants via advertisements on websites and social networking applications targeting gay men over a 3-month period during 2014 and 2015. The respondents were asked to complete a question-

naire available at http://www.sojump.com/. Upon completion, the volunteers could achieve a 6% chance of winning a 50 or 100 Chinese Yuan (US $8 or US $16) prize by leaving an email address that was used to inform winners.

A total of 1109 individuals from 188 cities in 30 provinces of China responded to the questionnaire. The following study inclusion criteria were applied: men aged ≥ 18 years who were able and willing to provide consent, lived in mainland China, and who had had sex with another man at least once during their lifetime. Of the 1109 respondents, 999 were included in the analysis; 110 respondents who refused to provide information about their CSA experience were excluded. Additionally, we excluded two respondents who self-identified as transgender as it was unclear whether they were trans men or women.

Measures

Childhood Sexual Abuse

The experiences of non-contact and contact CSA were assessed using items from a previous survey (Chen, Dunne, & Han, 2004) about childhood sexual experiences with three response options ("no," "yes," or "refuse to answer"). The following question addressed non-contact CSA: "Before the age of 18 years, did you have the experience of an adult exposing their genitals to you, masturbating in front of you, or trying to sexually arouse you when you did not want them to?" The following question addressed contact CSA: "Before the age of 18 years, did you have the experience of an adult who touched or fondled your body, including breasts or genitals; made you arouse them and touch their body in a sexual way; rubbed their genitals against your body in a sexual way; touched your genitals with their mouth; made you touch their genitals with your mouth; or tried to have or did have anal intercourse with you when you did not want them to?" CSA was also assessed in terms of frequency ("never," "once," "twice," or "three times or more"), which was coded as a categorical variable: 1–2 times was coded as rarely or infrequently, and > 2 times was coded as regularly. The severity of CSA was also coded as a categorical variable: "non-contact only" and "contact" CSA.

Sociodemographic Variables

These included age, highest level of education attained, occupation, monthly salary, and sexual orientation.

STI History

Participants were asked if they had ever had an STI (defined as a previous diagnosis of syphilis, gonorrhea, genital herpes, human papillomavirus, chlamydia, or a urinary tract infection). This generated a dichotomous variable.

Commercial Sex

Participants were asked if they had been paid for sex in the past 6 months (defined as exchanging sex for money). This generated a dichotomous variable to reflect at least one episode of exchanging sex for money.

Substance and Alcohol Use

Participants were asked if they had used substances in the past 6 months (defined as the use of drugs or substances such as alkyl nitrites ["poppers"], methamphetamine ["crystal meth"], sildenafil citrate ("Viagra®"), MDMA ["ecstasy"], ketamine, cocaine or crack cocaine, or marijuana). Additionally, to evaluate binge drinking, participants were asked "how often did you have five or more drinks of alcohol within 2 h during the past 6 months?".

Sexual Behaviors

Risky sexual behaviors were assessed dichotomously (yes/no) and included: condomless anal sex with men (defined as insertive or receptive anal sex without a condom with a primary male sexual partner or with any secondary male sexual partners) and condomless vaginal sex with women (defined as vaginal sex without a condom with a primary female sexual partner or with any secondary female sexual partners) in the past 6 months. Participants were also asked whether they had used a condom during their last sexual encounter. Additionally, participants were asked to report the number of male and female sexual partners they had had in the past 6 months.

Mental Health

Mental health was measured using the Kessler Psychological Distress Scale (Kessler et al., 2002). This scale includes six items (e.g., "During the last 30 days, approximately how often did you feel worthless?" and "During the last 30 days, approximately how often did you feel restless or fidgety?"). The response to each question was scored using a five-point Likert-type scale ranging from 1 (none of the time) to 5 (all of the time). Scores ranged from 6 to 30, with higher scores indicating higher levels of psychological distress. The Cronbach's α of the scale in this study was 0.95.

Statistical Analysis

Data were analyzed using SPSS statistical software, version 17.0 (SPSS Inc., Chicago, IL, USA) and Stata statistical software, release 12.0 (StataCorp LP, College Station, TX, USA). We calculated the descriptive statistics for sociodemographic variables and HIV-related risk factors. To investigate whether distinct HIV-related risk factors (e.g., substance use, number of

sexual male partners, condomless anal sex with men, and psychological distress) each exhibited an increased likelihood of association with the frequency and severity of CSA, multinomial logistic regression analyses were performed using CSA as a dependent variable, as described in previous literature (Phillips et al., 2014; Richter et al., 2014; Welles et al., 2009). Furthermore, final estimates of the associations between the measures of CSA (frequency and severity) and each separate HIV-related risk factor were adjusted for sociodemographic confounding factors. For all logistic regression analyses, odds ratios (ORs) are reported with 95% confidence intervals (CIs).

Results

Sociodemographic Characteristics and the Prevalence of CSA

The mean age of this sample was 25.06 years (SD = 5.97 years). Most participants were well-educated (74.1% had at least a college degree) and were not current students (69.8%). Additionally, most participants self-identified as gay or bisexual (87.6%). Overall, 14.2% of participants reported rare or infrequent CSA and 26.5% reported regular CSA; 11.1% reported a history of non-contact CSA only, whereas 29.6% reported a history of contact CSA.

HIV-Related Risk Factors

Nearly one-fifth (22.2%) of respondents reported a history of STIs. In the past 6 months, 6.0% of respondents had been paid for sex, 31.2% had used substances, 44.9% had a history of binge drinking, 53.9% had experienced condomless anal sex with men, and 18.8% had experienced condomless vaginal sex with women. In addition, 17.3% of MSM did not use a condom during their last sexual encounter. The average numbers of male and female sexual partners during the past 6 months were 3.59 (SD = 5.18) and 0.42 (SD = 1.62), respectively (Table 1).

Associations Between CSA and HIV-Related Risk Factors

In the unadjusted model in which the frequency of CSA was the dependent variable, having commercial sex was significantly associated with increased odds of reporting regular CSA (OR, 1.76; 95% CI 0.99–3.12; $p = .05$). Participants with a history of STIs (OR, 1.98; 95% CI 1.42–2.75; $p < .001$) and substance use (OR, 1.93; 95% CI 1.43–2.62; $p < .001$) were significantly more likely to report regular CSA, as were MSM with a greater number of male sexual partners (OR, 1.07; 95% CI 1.04–1.10; $p < .001$) and those who engaged in condomless anal sex with men (OR, 1.97; 95% CI 1.46–2.66; $p < .001$). In addition, both increased symptoms of psychological distress and failure to

use a condom during the most recent sexual encounter were significantly positively associated with reporting both rare/infrequent and regular CSA (Table 2). Condomless vaginal sex with women was associated with increased odds of reporting rare/infrequent CSA (OR, 1.67; 95% CI 1.08–2.59; $p < .05$). In contrast, no significant associations were observed between the frequency of CSA and binge drinking or the number of female sexual partners.

In the unadjusted model in which the severity of CSA was the dependent variable, participants with a history of STIs (OR, 1.80; 95% CI 1.30–2.50; $p < .001$) and substance use (OR, 1.73; 95% CI 1.29–2.33; $p < .001$) were significantly more likely to report contact CSA. A greater number of male sexual partners and failure to use a condom during the most recent sexual encounter were significantly associated with reporting both non-contact and contact CSA (Table 2). Participants who had condomless anal sex with men (OR, 1.80; 95% CI 1.35–2.39; $p < .001$) and those who reported condomless vaginal sex with women (OR, 1.46; 95% CI 1.03–2.08; $p < .05$) were significantly more likely to report contact CSA. In addition, increased psychological distress was significantly associated with increased odds of reporting contact CSA (OR, 1.05; 95% CI 1.02–1.08; $p < .001$). In contrast, no significant associations were observed between the severity of CSA and commercial sex, binge drinking, or the number of female sexual partners.

In the adjusted models, the frequency of CSA was not found to correlate significantly with commercial sex or condomless vaginal sex with women ($p > .05$ for both) after controlling for sociodemographic confounders. More importantly, the associations between the frequency of CSA and a history of STIs, substance use, binge drinking, other sexual behaviors (e.g., number of male and female sexual partners), and psychological distress remained almost the same between the adjusted and unadjusted models (Table 3).

The adjusted analysis showed no significant relationship between the severity of CSA and condomless vaginal sex with women ($p > .05$) after controlling for sociodemographic confounders. Moreover, the associations between the severity of CSA and a history of STIs, substance use, binge drinking, other sexual behaviors, and psychological distress remained almost the same between the adjusted and unadjusted models (Table 3).

Discussion

A high prevalence of CSA was observed in this cross-sectional sample of Chinese MSM, with almost two-fifths of respondents reporting a history of CSA. More importantly, this is the first study, to our knowledge, to examine the associations between CSA and HIV-related risks (behavioral, sexual, and mental health outcomes) in a national sample of MSM in mainland China. Our findings demonstrate that in this population, both

Table 1 Descriptive statistics of the frequency and the severity of CSA on sociodemographics and HIV-related risks: A survey of a national Chinese MSM sample in 2014 and 2015

		Frequency of CSA		Severity of CSA	
	No (592; 59.3%)	Rare/infrequent (142; 14.2%)	Regular (265; 26.5%)	N-CSA only (111; 11.1%)	C-CSA (296; 29.6%)
Sociodemographics					
Age					
18–25 years	409 (69.1)	95 (66.9)	153 (57.7)	71 (64.0)	177 (59.8)
>25 years	183 (30.9)	47 (33.1)	112 (42.3)	40 (36.0)	119 (40.2)
Educational level					
High school or less	138 (23.3)	43 (30.3)	78 (29.4)	27 (24.3)	94 (31.8)
College or more	454 (76.7)	99 (69.7)	187 (70.6)	84 (75.7)	202 (68.2)
Occupation					
Student	182 (30.7)	50 (35.2)	70 (26.4)	43 (38.7)	77 (26.0)
Not student	410 (69.3)	92 (64.8)	195 (73.6)	68 (61.3)	219 (74.0)
Monthly salary					
<¥2000	215 (36.3)	54 (38.0)	82 (30.9)	46 (41.4)	90 (30.4)
≥¥2000	377 (63.7)	88 (62.0)	183 (69.1)	65 (58.6)	206 (69.6)
Sexual orientation					
Gay/bisexual	514 (86.8)	127 (89.4)	234 (88.3)	99 (89.2)	262 (88.5)
Heterosexual/other	78 (13.2)	15 (10.6)	31 (11.7)	12 (10.8)	34 (11.5)
Commercial sex					
No	563 (95.1)	133 (93.7)	243 (91.7)	101 (91.0)	275 (92.9)
Yes	29 (4.9)	9 (6.3)	22 (8.3)	10 (9.0)	21 (7.1)
History of STIs					
No	481 (81.3)	114 (80.3)	182 (68.7)	87 (78.4)	209 (70.6)
Yes	111 (18.7)	28 (19.7)	83 (31.3)	24 (21.6)	87 (29.4)
Substance and drink use					
Substance use					
No	433 (73.1)	99 (69.7)	155 (58.5)	73 (65.8)	181 (38.9)
Yes	159 (26.9)	43 (30.3)	110 (41.5)	38 (34.2)	115 (61.1)
Binge drinking					
No	341 (57.6)	73 (51.4)	136 (51.3)	56 (50.5)	153 (51.7)
Yes	251 (42.4)	69 (48.6)	129 (48.7)	55 (49.5)	143 (48.3)
Sexual Behavior					
Number male partner *M* (SD)	3.02 (4.58)	3.37 (4.19)	5.00 (6.48)	4.00 (4.79)	4.60 (6.18)
Number female partner *M* (SD)	0.35 (1.67)	0.52 (2.27)	0.40 (0.98)	0.56 (2.48)	0.39 (1.02)
CASM					
No	303 (51.2)	66 (46.5)	92 (34.7)	49 (44.1)	109 (36.8)
Yes	289 (48.8)	76 (53.5)	173 (65.3)	62 (55.9)	187 (63.2)
CVSW					
No	495 (83.6)	107 (75.4)	209 (78.9)	86 (77.5)	230 (77.7)
Yes	97 (16.4)	35 (24.6)	56 (21.1)	25 (22.5)	66 (22.3)
Last condomless sex					
No	510 (86.1)	110 (77.5)	206 (77.7)	85 (76.6)	231 (78.0)
Yes	82 (13.9)	32 (22.5)	59 (22.3)	26 (23.4)	65 (22.0)
Psychological distress M (SD)	13.45 (5.52)	14.70 (5.69)	14.87 (5.88)	14.34 (5.52)	14.99 (5.91)

CSA childhood sexual abuse, *MSM* men who have sex with men, *N-CSA* non-contact CSA, and *C-CSA* contact CSA, *STIs* sexually transmitted infections, *CASM* condomless anal sex with men, and *CVSW* condomless vaginal sex with women

Table 2 Unadjusted multinomial logistic regression: The frequency and the severity of CSA as dependent variables

	Frequency of CSA; OR (95% CI)		Severity of CSA; OR (95% CI)	
	Rare/infrequent	Regular	N-CSA only	C-CSA
Sociodemographics				
Age (ref. 18–25 years)	1.11 (0.75, 1.63)	1.64** (1.21, 2.21)	1.26 (0.82, 1.93)	1.50** (1.12, 2.01)
Educational level (ref. College or more)	1.43 (0.95, 2.14)	1.37** (0.99, 1.90)	1.06 (0.66, 1.70)	1.53** (1.12, 2.09)
Occupation (ref. student)	0.82 (0.56, 1.20)	1.24 (0.89, 1.71)	0.70 (0.46, 1.07)	1.26 (0.92, 1.73)
Monthly salary (ref. <¥2000)	0.93 (0.64, 1.36)	1.27 (0.93, 1.73)	0.81 (0.53, 1.22)	1.31 (0.97, 1.76)
Sexual orientation (ref. Gay/bisexual)	0.78 (0.43, 1.40)	0.87 (0.56, 1.36)	0.80 (0.42, 1.52)	0.86 (0.56, 1.31)
Commercial sex (ref. no)	1.31 (0.61, 2.84)	1.76* (0.99, 3.12)	1.92 (0.91, 4.07)	1.48 (0.83, 2.65)
History of STIs (ref. no)	1.06 (0.67, 1.69)	1.98*** (1.42, 2.75)	1.20 (0.73, 1.97)	1.80*** (1.30, 2.50)
Substance and drink use				
Substance use (ref. no)	1.18 (0.79, 1.77)	1.93*** (1.43, 2.62)	1.42 (0.92, 2.18)	1.73*** (1.29, 2.33)
Binge drinking (ref. no)	1.28 (0.89, 1.85)	1.29 (0.96, 1.72)	1.33 (0.89, 2.00)	1.27 (0.96, 1.68)
Sexual behavior				
Number of male sex partners	1.02 (1.07, 2.26)	1.07*** (1.04, 1.10)	1.04* (1.00, 1.08)	1.06*** (1.03, 1.09)
Number of female sex partners	1.05 (0.96, 1.16)	1.02 (0.93, 1.12)	1.06 (0.96, 1.17)	1.02 (0.93, 1.12)
CASM (ref. no)	1.49 (0.84, 1.74)	1.97*** (1.46, 2.66)	1.33 (0.88, 2.00)	1.80*** (1.35, 2.39)
CVSW (ref. no)	1.67* (1.08, 2.59)	1.37 (0.95, 1.97)	1.48 (0.90, 2.44)	1.46* (1.03, 2.08)
Last condomless sex (ref. no)	1.81 (1.14, 2.86)	1.78** (1.23, 2.58)	1.90* (1.16, 3.13)	1.75** (1.22, 2.51)
Psychological distress	1.04* (1.01, 1.07)	1.05** (1.02, 1.07)	1.03 (0.99, 1.07)	1.05*** (1.02, 1.08)

CSA childhood sexual abuse, *N-CSA* non-contact CSA, *C-CSA* contact CSA, *OR* odds ratios, *CI* confidence interval, *STIs* sexually transmitted infections, *CASM* condomless anal sex with men, and *CVSW* condomless vaginal sex with women

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 3 Adjusted multinomial logistic regression: Associations between CSA and HIV-related risks

	Frequency of CSA; AOR (95% CI)		Severity of CSA; AOR (95% CI)	
	Rare/infrequent	Regular	N-CSA only	C-CSA
Commercial sex (ref. no)	1.27 (0.58, 2.76)	1.61 (0.90, 2.88)	1.86 (0.87, 3.96)	1.36 (0.76, 2.49)
History of STIs (ref. no)	1.02 (0.64, 1.64)	1.81*** (1.29, 2.55)	1.18 (0.71, 1.96)	1.65** (1.18, 2.96)
Substance and drink use				
Substance use (ref. no)	1.22 (0.81, 1.84)	1.91*** (1.39, 2.62)	1.50 (0.96, 2.34)	1.70*** (1.25, 2.31)
Binge drinking (ref. no)	1.29 (0.89, 1.88)	1.31 (0.97, 1.75)	1.33 (0.88, 2.01)	1.29 (0.97, 2.72)
Sexual behavior				
Number of male sex partners	1.02 (0.98, 1.06)	1.06*** (1.04, 1.09)	1.04* (1.00, 1.08)	1.05*** (1.03, 1.08)
Number of female sex partners	1.05 (0.95, 1.15)	0.99 (0.90, 1.10)	1.06 (0.96, 1.16)	0.99 (0.90, 1.09)
CASM (ref. no)	1.18 (0.82, 1.71)	1.89*** (1.39, 2.56)	1.31 (0.87, 1.99)	1.72*** (1.29, 2.30)
CVSW (ref. no)	1.59 (0.93, 2.67)	1.21 (0.83, 1.78)	1.53 (0.91, 2.57)	1.31 (0.91, 1.89)
Last condomless sex (ref. no)	1.76* (1.11, 2.79)	1.76** (1.20, 2.56)	1.85* (1.12, 3.06)	1.72** (1.20, 2.48)
Psychological distress	1.04** (1.01, 1.08)	1.05*** (1.02, 1.08)	1.03 (1.00, 1.07)	1.05*** (1.03, 1.08)

No CSA group as referent. Adjusted for age, education, occupation, monthly salary, and sexual orientation

CSA childhood sexual abuse, *N-CSA* non-contact CSA, *C-CSA* contact CSA, *AOR* adjusted odds ratios, *CI* confidence interval, *STIs* sexually transmitted infections, *CASM* condomless anal sex with men, and *CVSW* condomless vaginal sex with women

* $p < .05$; ** $p < .01$; *** $p < .001$

the frequency and severity of reported CSA are associated with risky sexual behaviors such as multiple male sexual partners, condomless anal sex with men, and failure to use a condom during the most recent sexual encounter. Reported CSA was also associated with substance use, a history of STIs, and psychological distress among Chinese MSM.

The high prevalence of CSA observed in the present study is consistent with other studies (Hequembourg et al., 2015; Lenderking et al., 1997). Despite limitations related to differences in the operational definitions of CSA, the prevalence of CSA is evidently higher in the MSM community than in the general population (Friedman et al., 2011; Xu & Zheng, 2015a; Zou & Andersen, 2015). As CSA has wide-ranging and long-lasting negative effects on the mental and public health of victims, this topic should receive more attention, especially among the Chinese MSM community.

We found that both the frequency and severity of CSA were associated with a reported history of substance use after adjusting for sociodemographic confounders. This finding is somewhat consistent with those of previous Western studies (Brennan et al., 2007; Paul et al., 2001). However, no significant associations were observed between CSA and binge drinking. We note that binge drinking might differ from alcohol dependency (i.e., heavy drinking) in that binge drinkers might engage in occasional nights of heavy consumption, whereas heavy drinkers might engage in more frequent and problematic alcohol consumption. This distinction may contribute to some of the inconsistencies in prior research regarding associations between CSA and drinking patterns among MSM (Phillips et al., 2014; Levine et al., 2017). Additionally, the adjusted regression model demonstrated no significant association between CSA and commercial sex in the past 6 months. However, this result may be attributable to the low frequency of commercial sex in the sample (only 6%); accordingly, the sample might not have had sufficient power to detect a significant effect, which would contribute to the null association of this factor with CSA history.

By providing adjusted relative measures according to the frequency and severity of CSA, our findings extend those of previous reports on HIV-related sexual behaviors among MSM who report CSA. After adjusting for potential confounders, MSM with a greater number of male sexual partners, who engage in condomless anal sex with men, and who did not use condoms during their last sexual encounter were much more likely to report having experienced regular and contact CSA, thereby validating the existence of associations between CSA and the aforementioned HIV-risk-related sexual behaviors among Chinese MSM. After controlling for potential confounders, MSM with a history of STIs were significantly more likely to report having experienced regular and contact CSA. Multiple studies (Messman-Moore & Long, 2003; Sutherland, 2010) also indicated that individuals who reported CSA were more likely to exhibit a series of risk-taking behaviors that may place them at

risk for STIs. In addition, an STI (specifically, an ulcerative STI) is a risk factor for HIV infection.

Almost 50% of participants in this sample reported severe psychological distress, which suggests a very high prevalence of adverse mental health outcomes among Chinese MSM. In the multinomial logistic model, MSM who reported that they had regularly experienced CSA, as well as those who reported contact CSA, were more likely to report symptoms of psychological distress, compared with MSM who had not experienced CSA. Notably, this association has been extensively documented among Western populations (Bonacquisti, Geller, & Aaron, 2014; Browne & Finkelhor, 1986; Winham et al., 2015).

Overall, our findings of the associations between CSA and HIV-related risks (substance use, sexual behaviors, and psychological distress) will likely be invaluable when clarifying the transmission of HIV among MSM in China and thus would be helpful for preventing HIV transmission. For instance, information about CSA will be particularly useful to clinics and health care providers who devise behavioral interventions for at-risk MSM. These interventions could incorporate counseling and skill development to reduce risky behaviors and address mental health problems and could target participants according to the number of CSA experiences. Further studies should investigate the longitudinal association between the severity of CSA and risky behaviors, as well as the personal, interpersonal, and social mediators of these relationships among MSM and other sexual minorities. These studies could focus on the traumagenic dynamics theory (Browne & Finkelhor, 1986) to target both CSA trauma and current sexual risk reduction for the prevention of HIV. Additionally, researchers could examine trauma-related processes (e.g., experiential avoidance and internalized homophobia) (Fortier et al., 2009; Gold & Marx, 2007; Rosenthal et al., 2005) as possible mediators underlying the associations between CSA and mental health (e.g., psychological distress and post-traumatic stress disorder symptoms) among MSM in China. Lastly, as all sexual and substance use behaviors were assessed via single-item self-reports, more sophisticated measures, such as timeline follow-back, will be essential to further studies.

This study had some limitations. First, the internet-based sampling method and ultimate data selection criteria may have contributed to sampling bias by excluding, for example, those unwilling to answer questions about personal sex-related issues. Moreover, nearly 10% of participants were excluded because of missing data regarding CSA experiences, which might have led to the over- or under-reporting of CSA rates. Second, it is extremely difficult to collect face-to-face data from Chinese MSM. Accordingly, this study and other studies with similar participant groups (Coleman et al., 2010; Xu, Zheng, Liu, & Zheng, 2016) share a common limitation: namely a primarily young MSM sample is more likely to be recruited than an older

sample, thus reducing generalizability. Third, the history of CSA relied on retrospective reports, which may have introduced recall bias. Finally, the definition of CSA in this study did not include perpetrator–victim age differences or forced childhood sexual encounters with older partners, which may have led to mis-estimated CSA rates and attenuated the statistical associations between CSA and HIV-related risks.

Despite these limitations, this study verified the prevalence of HIV-related risks (substance use, sexual behaviors, and psychological distress) and their associations with CSA in a national sample of MSM in China. Furthermore, our use of an internet-based sampling procedure is quite remarkable, given the stigmatization of homosexuality in Chinese culture and the fact that MSM generally only use social networks to seek out partners. Importantly, our study extends previous reports in which MSM who reported regularly having experienced CSA, as well as those who reported contact CSA, were found to be more likely to engage in HIV-related behavioral and sexual health outcomes and were more likely to suffer from psychological distress in China. We believe our results will contribute to HIV prevention, intervention, and health care for MSM in China.

Compliance with Ethical Standards

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